DEPARTMENT OF INTERIOR APPROPRIATIONS FOR 1952

FRIDAY, MAY 11, 1951

UNITED STATES SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D. C.

The subcommittee met, at 10 a. m., pursuant to recess, in room F-39, Hon. Carl Hayden (chairman of the subcommittee) presiding.
Present: Senators Hayden, Ellender, Cordon, and Young.

BONNEVILLE POWER ADMINISTRATION

STATEMENTS OF PAUL J. RAVER, ADMINISTRATOR; D. L. MARLETT, ASSISTANT ADMINISTRATOR; JOHN MULCAHY, ENGINEER, AND JOHN D. DAVIS, MANAGER, WASHINGTON, D. C., OFFICE

CONSTRUCTION

BUDGET ESTIMATE AND HOUSE ACTION

Senator HAYDEN. The committee will come to order.

We will now take up the regular appropriation for the Bonneville Power Administration for the fiscal year 1952.

The item appears on page 5, line 16, of the bill. The budget estimate is $69,500,000.

The House committee allowed an appropriation of $67,500,000, or a reduction of $2 million under the estimate.

However, on the House floor on the motion of Mr. Ford, of Michigan, a further reduction of $5,500,000 was made, reducing the total figure to $62 million.

The Department is requesting that the amount of $62 million be deleted, and that $67,500,000 be inserted in lieu thereof, to provide an increase of $5,500,000, and to provide the same amount of appropriation as recommended by the House committee.

JUSTIFICATION

I will place the Department's justification in the record at this point.
(The justification referred to follows:)

CONSTRUCTION

(Estimate, $69,500,000; act, $39,500,000 plus $1,450,000 supplemental)

(House hearings, pt. 1, pp. 153–182)

(P. 5, line 16)

Page 5, line 16, strike out "$62,000,000" and insert in lieu thereof "$67,500,000", an increase of $5,500,000 in the appropriation.

HOUSE REPORT

An appropriation of $67,500,000 is approved in lieu of the estimate of $69,500,000. The sum recommended is to enable the Bonneville Administration to carry out its program of construction of transmission facilities already approved by the Congress and to initiate construction of additional facilities to conform with the schedules under which new generating capacity is to be available. Before the end of 1955 generation is scheduled to be provided by eight new plants in addition to the capacity still to be added at Grand Coulee Dam.

Although it recommended a general reduction of $2,000,000 in the estimate, the committee has approved the Bonneville construction program as submitted with one additional item. A substation should be provided by Bonneville Power Administration at Warden, Wash., and $48,000 of the sum approved is to be available for that purpose.

JUSTIFICATION

The amendment restores $5,500,000 of the reduction of $7,500,000 made by the House in the budget estimate for this appropriation. This amount is distributed to activities as follows:

Activity	Appropriated, 1951	Budget estimate, 1952	House bill, 1952	Restoration requested
a. Construction in progress	$34,536,000	$61,164,000	$55,437,000	$3,827,000
b. New construction	4,738,000	7,271,000	5,498,000	1,673,000
c. General plant	1,676,000	1,065,000	1,065,000	
Total	40,950,000	69,500,000	62,000,000	5,500,000

A breakdown of the restoration request by objects of expenditure follows:

Personal services	$450,000	Supplies and materials	$1,438,000
Travel	95,000	Equipment	1,500,000
Transportation of things		Lands and structures	2,000,000
Communication services	2,000	Grants, subsidies, and contributions	1,000
Rents and utility services	4,000		
Printing and reproduction		Total	5,500,000
Other contractual services	10,000		

Funds requested in the 1952 construction program are for facilities to transmit power from generating plants to load centers and customers. The allowance of $62 million by the House will provide only the amounts needed to continue work on facilities which are already under way. Amounts required for new facilities scheduled to start in fiscal year 1952 nearly total the $7½ million cut from the Administration's estimates by the House. In assigning these cuts to individual transmission facilities, the Administration has made adjustments on the basis of the relative urgency of these items. It will be necessary to delay work under way in order to take care of highest priority new starts. The manner in which these cuts have been applied to the Administration's program is set forth in the accompanying table. The effects of these cuts on the Administration's construction program are as follows:

(1) Investments in work under way will lie idle until funds are provided to finish the work. Transmission line losses will be increased due to the overloading of lines with a resulting decrease in revenue. These factors will result in uneconomical prosecution of the Administration's construction program.

(2) The elimination or delay of facilities in the construction program will necessitate running of a greater risk on existing facilities which will be overloaded or inadequate to meet load requirements. This will result in endangering reliability of power service from the Administration's system and on systems interconnected with it, and will increase the possibility of outages, further endangering customers' service.

(3) The construction of major transmission facilities to take power from Federal power plants will be delayed. Since these schedules are already tight in terms of materials deliveries and seasonal working conditions, reduction in available funds will add to the tightening of these schedules so that the Administration can no longer take advantage of any possible favorable conditions to regain losses in timing.

(4) Since the Administration's construction program is geared to scheduled power supply and load requirements, it will be necessary in later years to construct the transmission facilities delayed as a result of the House cuts. Therefore, there will be no permanent saving to the Federal Government in deferring these facilities. The experience of the Administration in the past year has indicated lengthening of delivery dates for materials and equipment and increases in prices. Therefore, delays in the construction of these facilities may result in increased costs.

(5) The Administration's transmission system is normally designed with a minimum of reserve capacity. Any delay of the major items in the program can only result in increased loading on existing facilities. This overloading will become especially severe in the event of any further delay in one of the higher priority projects beyond its scheduled completion date. The extreme loadings that would result from these conditions will appreciably increase the possibility of damage to major equipment in the system.

Allocation of reductions to 1952 construction program

Facility	Allocation of reductions	
	Not included in appeal	Included in appeal
I. General-major 230-kv grid:		
6. Columbia-Olympia		$1,983,000
8. Goldbar-Covington	$1,093,000	
9. Grand Coulee-Snohomish No. 2		91,000
16. Detroit-Chemawa		810,000
17. Ross-St. Johns Conversion	212,000	
19. Detroit-Goshen	88,000	
20. Southwest Oregon loop service		177,000
21. Coos Bay area service		75,000
25. System reactive facilities		58,000
IA. Coastal Area—Puget Sound:		
3. Olympia-Shelton-Port Angeles	19,000	
5. Shelton-Bremerton No. 2	100,000	451,000
11. Tacoma loop	300,000	
13. Raymond-Aberdeen		298,000
IB. Coastal Area—Portland, Longview, Chehalis area: 14. Westport-Cathlamet		148,000
IC. Coastal area—southwest Oregon:		
2. Eugene-Reedsport		60,000
3. Reedsport-Coos		207,000
9. McKinley-Gold Beach		47,000
10. Lebanon-Springfield		233,000
IIA. Central area—Spokane: 2. Spokane-Colville-Spirit	17,000	
IIC. Central area—central Washington, central and eastern Oregon:		
2. Columbia-Ellensburg	100,000	
3. McNary-Pasco		30,000
4. Okanogan-Tonasket-Republic		200,000
6. Richland-Kennewick		50,000
10. The Dalles-Goldendale		61,000
20. Moxee switching station		181,000
23. Franklin County		200,000
29. Rocky Ford-Soap Lake	71,000	
IV. General: 2. Communication facilities		140,000
Total	2,000,000	5,500,000

GENERAL STATEMENT

Senator HAYDEN. You may proceed with your statement.

Mr. RAVER. Mr. Chairman, the House of Representatives, in acting on the 1952 appropriation bill, has cut the construction budget request of the Bonneville Power Administration from $69,500,000 to $62,000,000. Of this $7,500,000 cut, $2 million was recommended by the House Committee on Appropriations.

We are not appealing the amounts involved in the committee action, since it now appears that the savings necessary to meet this cut can be achieved through changes in construction schedules, by omission

of certain facilities, and by some changes in engineering plans which we have been able to work out since the Administration's estimates were transmitted to Congress.

The committee has approved the carrying out of the Bonneville construction program of transmission facilities already approved by Congress and initiation of additional facilities to conform with the schedules under which new generating capacity is to be available.

The budget request is based on a schedule of generation which will bring in an additional 1,300,000 kilowatts between December 1950 and December 1954.

Generation to be installed by December 1954

Project	Dates in service	Installed capacity [1] December 1954	December peaking capability	At site prime power [2]	Downstream benefit from new storage [3]
		Million watts	*Million watts*	*Average million watts*	*Average million watts*
Raise Bonneville Pool				40	
Additional 3 units at Grand Coulee	April–September 1951.	324	360		
Hungry Horse	September 1952–November 1953.	285	300	221	242
Albeni Falls	August 1952				92
Detroit	June–December 1953.	100	98	29	
Big Cliff	December 1953	18	21	10	
McNary	December 1953–December 1954.	420	483	415	
Lookout Point (Meridian)	July 1954	115	68	19	
Dexter	December 1954	15	16	9	
Total		1,277	1,346	743	334

[1] Name plate rating.
[2] Prime power is average over storage drawdown season.
[3] Storage benefit from the Hungry Horse and Albeni Falls projects is effective over the 1954–55 storage drawdown season at downstream plants as follows:

Bonneville	50 average million watts
Grand Coulee	284 average million watts
Total	334 average million watt

RESTORATION REQUESTED

Our studies show that by accepting some risks we can carry forward the Administration's program on the basis of the $2,000,000 reduction prescribed by the committee. However, we must appeal the additional $5,500,000 reduction contained in the final House bill if we are to maintain the required construction schedule.

In the House debate in the amendment, there was no indication of a basis on which to take this cut, and furthermore, there is no indication of a slow-down in generation schedules by the House. There has been no questioning of the fact that power load growth in the Northwest is outstripping generation under present schedules.

EFFECT OF HOUSE ACTION

After a thorough review of all the facilities in the 1952 estimate, both new and under construction, we find it impossible to apply a cut of its size without seriously affecting our ability to transmit power in an

amount to meet the minimum needs of the Pacific Northwest and the generation schedule as indicated above. The results of the final House action would be felt in several major respects.

1. Service to the area would be rendered only on the basis of an extreme emergency. Low voltages would prevail throughout the area and the entire Northwest, and long and frequent system-wide outages could be expected.

2. Some customers would be limited in the amount of power delivered at existing connections and others would be deprived of needed new points of delivery. These problems will be accentuated because there will not be enough reserve capacity in the transmission system to permit rerouting power flows.

3. There would be a financial loss to the Government by reason of (*a*) partly completed facilities lying idle until funds become available to complete the work; (*b*) uneconomical loading of transmission lines resulting in high losses which would reduce salable power, and (*c*) shortened life and failure of apparatus from operation under emergency overload conditions.

Recent developments that could not be contemplated in our 1952 budget presentation will intensify the foregoing effects. Notable in this respect are two new hydroelectric projects:

(1) The Cabinet Gorge power plant of the Washington Water Power Co. located in northern Idaho, and

(2) Additions to the Rock Island plant by the Chelan County public utility district.

The Cabinet Gorge plant will deliver its output into the Spokane area, thereby increasing to the extent of 200,000 kilowatts the loading on the circuits to the west and south of Grand Coulee dam. At Rock Island, plans are under way for the installation of 120,000 kilowatts of additional firm power. Associated with this generation will be an aluminum plant requiring 170,000 kilowatts of power, 50,000 kilowatts of which will be supplied by the Administration on an interruptible basis. This creates an additional defense demand on the Administration's transmission system.

PASSENGER MOTOR VEHICLES

The House also reduced the committee proposal for the purchase of new passenger vehicles, eliminating all additional vehicles for the Administration's passenger car fleet. Our experience in recent years has indicated that the rapid addition of new transmission facilities which we are experiencing, and the extension of the Administration's operating area, have resulted in a considerable strain upon the Administration's passenger-car facilities. These cars are needed to transport Administration employees to points on the Administration's system on short notice.

JENSEN AMENDMENT

An additional action on the floor of the House of Representatives was taken to eliminate the possibilities of filling positions vacated during fiscal year 1952, except for 25 percent of such vacancies. This provision will make our job particularly difficult in the Administration, since such a large portion of our employees are engaged in the direct operation of transmission facilities which are supplying critical

civilian and defense needs. Our experience in employee turn-over during the past year indicates a turn-over figure of approximately 30 percent. If the inhibition against filling vacancies is to be applied to the Administration, this will result in a loss of 22½ percent of the Administration's total employees, with the result that the prosecution of our construction program and the operating and maintenance program would be seriously impaired. I might also point out in this connection that a large number of employees have left the Administration and have been called into the Armed Forces. Many of these employees have been highly skilled engineers whose loss to the Administration's program has been serious. To prohibit the Administration from filling positions in these highly technical fields, such as communications and design, will seriously affect our ability to meet some of the most difficult technical problems confronting us.

PROGRAM TO OVERCOME POWER SHORTAGE IN PACIFIC NORTHWEST

This committee is well aware of the problems we face on power supply in the Pacific Northwest. I would, however, like to mention briefly some of the things being done in the region to meet the immediate problem.

I have already indicated the scheduled Federal generation between now and December 1954 and mentioned two of the plants which are under construction by the Washington Water Power Co. and the Chelan County public utility district. There are additional facilities, both non-Federal and Federal, which are being planned jointly by all power agencies, public and private, in an effort to overcome the Pacific Northwest power shortage and to make as much contribution as possible to the defense production program.

The generating additions at the Rock Island and Cabinet Gorge hydroelectric projects are now definitely in progress for completion by 1952 and 1953.

The Yale project of the Pacific Power & Light Co. has been certified as a defense project and licensed by the Federal Power Commission to add approximately 50,000 kilowatts of prime power to the region by 1952 or 1953.

The Box Canyon project of the Pend Oreille County public utility district has been certified as a defense project and has a preliminary permit from the Federal Power Commission with a view to adding another 50,000 kilowatts of prime power for 1953.

The Oregon-California interconnection has been certified as a defense project and has been proposed by the Bureau of Reclamation in its 1952 construction program. Completion of this intertie would add 100,000 kilowatts of firm power in the Pacific Northwest. This power would be particularly important to the area since it would become available during the period when defense loads are increasing rapidly and the region is in urgent need of additional firm power supplies to assure adequate service to the entire area and maximum defense production.

We are also studying other measures to improve power supply in the region. These include the installation of steam plants at strategic points in the Federal system, further interconnection with adjacent power systems, raising of the pool at Bonneville Dam and appraisal of other possible additions to generating capacity which might be installed by non-Federal agencies within the next 2 to 3 years.

By these measures, the contribution of BPA and the region to the defense program will be increased rapidly. Longer range plans to initiate construction on Ice Harbor, The Dalles, and Hells Canyon dams are being presented to Congress. These dams are scheduled to provide power beginning in 1955 and 1956. Therefore, together with the additional generators to be installed at McNary Dam and Chief Joseph Dam during 1955 and subsequent years, the long-range outlook for power in the region will be considerably improved if appropriations are made available consistent with the fastest possible construction schedule.

Senator HAYDEN. You mentioned a schedule of generation for increased election power between 1950 and 1954. Will the reduction of $2 million which you have accepted delay the schedule that you originally had?

Mr. RAVER. No, sir; not seriously.

We have made some adjustments in our plan to take care of that $2 million.

We have also had some savings in costs on some of our construction problems.

Senator HAYDEN. We do not know how long we are going to be in that state of cold war. It may be a long time. If we are, we are going to be under a great burden of expense for national defense. That expense can be borne by just what resources the country now has, or it can also be helped to be carried by expansion of development of our resources.

I would feel that if it was essential, therefore, to keep pace with the ability of the people to earn and pay the money to carry on this job, that additional investment be made from time to time in the development of our natural resources that would be justified under the circumstances when money is so badly needed for national defense.

If, on the other hand, you can carry on your program in an orderly way, in regard to the increase in the power development and the use of our natural resources keeps pace with the defense demands, then we should not spend money.

AMOUNT FOR PURCHASE OF MATERIALS

Senator YOUNG. Mr. Chairman, of this $69,500,000, how much is to be spent to purchase materials?

Mr. RAVER. It would be somewhere between $20 million and $25 million on the basis of the way these figures are broken down.

Senator YOUNG. Do you anticipate any roll-back in prices as a result of the price control program?

Mr. RAVER. We have not anticipated any. We have not made any estimates for this work on the basis of any roll-back.

Senator YOUNG. It seems to me the whole plea of Mr. Wilson on down the line is that it would save on our budgets by reducing the costs and stopping this inflation.

If the only roll-backs are going to come in the few agricultural commodities, then I think we might as well abolish the whole act.

It seems to me somewhere in these budgets there ought to be some proposed cuts as the result of roll-back in prices.

Mr. RAVER. Our costs have not been inflated to the same extent I understand inflation is going on in the things that I have to buy.

We have been able to offset some of the inflationary aspects of price rises by engineering advances in the art. We have set the effect of price increases back considerably. It is demonstrated very clearly in our costs and income set-up.

COST OF POWER TO CONSUMER

We have not changed our rates basically since we started operation in 1939. We are still selling power at $17.50 per kilowatt-year.

Wages have more than doubled in that period.

The cost of equipment has doubled.

Yet the cost per kilowatt of capacity has not doubled. The operating costs have not doubled. It has been due to some changes in engineering design and changes in operating methods which have held our costs down as indicated by the fact that our net income this year will be three million dollars higher than it was last year.

Senator YOUNG. Your net earnings would still be higher in proportion if your costs could be held down on the things you have to buy?

Mr. RAVER. There is no question about that, but we have not raised our price for power despite increased costs of material and labor.

As a selling agent our price is just the same for our commodity now as it was when we started and we are still adding net income to our accumulated surplus.

Senator YOUNG. It seems to me that I saw a statement to the effect that you anticipate sometime in the next 2 or 3 years you will have to raise your rates.

Mr. RAVER. I think that is right. You would never get that from an analysis of what has been going on up to date, however.

It is only in anticipation of new dams coming into this picture with a very large amount of power in those dams at a higher cost that we will be unable to overcome that higher cost by mixing it in with our present lower cost investment.

ANTICIPATED RATE ADJUSTMENT DUE TO RISING COST OF EQUIPMENT

We will have to have some rate adjustment in order to cover the higher cost of this equipment coming in.

The effect of this price increase is going to hit us later on, but it has not hit us yet.

Senator YOUNG. Do you figure there has been an increase in this $28 million you mentioned?

Mr. RAVER. I would have to check into that, but my impression in looking at the contracts is that probably 10 percent would cover it in the past year.

Senator YOUNG. That is since Korea?

Mr. RAVER. I would say we have had about a 15 or 20 percent price increase all told, which is pretty serious.

Senator YOUNG. You mean since Pearl Harbor?

Mr. RAVER. All told in the past 2 years.

Senator YOUNG. I think we ought to get some information from the men who are running the stabilization program to find out how much they propose to roll back the price of materials that make up a large part of the budget for the Army, the Navy, and other branches of the Government.

Senator HAYDEN. Up to now I have heard nothing.

On the other hand they appear before the committees of Congress and say "We have just lost, by reason of these prices being increased, billions of dollars."

What is being done about rolling them back, I have not heard. Last night we passed, on the floor, an amendment previously adopted by the House, to add some 9½ million dollars to the cost of the radio facilities used by the Voice of America because of the increased cost in manufacture.

Senator YOUNG. What is the price stabilization program doing?

Senator CORDON. Mr. Chairman, I have just been reading the record with respect to the action of the House in making this reduction.

If I understand, Doctor, it was a general reduction of the over-all figure of $67,500,000, and there was no indication on the part of the mover of the motion as to where the cut should apply, nor does the record disclose any discussion in that field, except the one item.

AMOUNT REQUESTED FOR TRAVEL

Mr. Ford was the sponsor of the motion and he called attention to the item of $1,482,746 for travel. He seemed to think that was rather an exorbitant amount to be charged to that particular item.

Will you explain to the committee that item?

Mr. RAVER. Yes, sir.

May I say, first of all, Senator, that is primarily construction travel, per diem, and the use of equipment in the field on construction jobs. It does include per diem when our men are away from their home stations.

EXTENT OF TRANSMISSION LINES OF BONNEVILLE SYSTEM

Senator CORDON. In order that we may have a better picture with respect to the item, because I can fully realize to one who is not familiar with the far-flung area of transmission the great number of miles of lines the figure might appear fantastic.

Will you tell the committee how many miles of transmission lines are in the Bonneville system?

Mr. RAVER. There are over 4,000 miles of line at the present time.

Senator CORDON. Who maintains the line? Who rides herd, as we say in the West, on all those miles of transmission lines?

Mr. RAVER. We have an operating force at Bonneville which has nothing else to do except that.

Senator CORDON. This travel does or does not include the mileage of the maintenance crews on this transmission system?

Mr. RAVER. It includes all that.

Senator CORDON. Has the administration located its maintenance crews over this area so as to minimize the transportation factor?

Mr. RAVER. We have, I think, made some progress in saving costs in that area by careful studies of proper location of maintenance and operating crews throughout the area.

Senator CORDON. You do not send maintenance men out from your headquarters, for instance, to take care of a line running through Idaho to Hungry Horse or down into Oregon, or over into eastern Washington, do you?

Mr. RAVER. No, sir. We have our system set up on the basis of minimizing that travel.

Senator CORDON. I would like to have you put into the record a statement indicating just how you set up that maintenance organization, whether you have them at strategic points to minimize travel costs, increased efficiency of the men for their working hours, or just what you do. I think it is important that the record should show that.

Take any given segment of the system on that.

Mr. RAVER. I will be glad to do that.

(Information requested, subsequently furnished, is as follows:)

BONNEVILLE POWER ADMINISTRATION

SYSTEM MAINTENANCE ORGANIZATION

The maintenance activity has been organized on a subregional or area basis with major supervisory headquarters at Vancouver, Seattle, and Spokane, Wash. The maintenance supervisors who have been placed at the head at each of the area maintenance organizations are fully responsible for carrying out maintenance activities within their assigned areas. The travel distance within these areas makes it possible for the supervisors to reach any point in the area of their responsibility and to return to home stations within a day, thus eliminating the need of paying per diem. There are three exceptions to this plan of operation. One is in the Walla Walla district and the second is in the Montana district, both of which are supervised by the Spokane office. The third is in the Coos Bay area, which is supervised by the Vancouver headquarters. All three of these exceptions result from the fact that the Administration's facilities are relatively few to date and therefore do not warrant full-time area supervision. As the transmission facilities of the Administration are extended or the number of facilities increased in southern Oregon and in eastern Washington and Montana, it may be necessary to establish additional area headquarters in order to obtain the economies of supervision and the required amount of supervisory coverage of working crews so that efficiencies to be derived from close supervision can be achieved.

Within the supervisory areas, substation crews are located on two bases. One consideration is the amount of territory which will enable a crew to cover a maximum number of substations on a preventative maintenance basis. For example, it recently was determined to transfer the crew formerly located at Walla Walla to Kennewick, Wash. The reason for this move is the fact that additional substation facilities to serve Franklin and Benton Counties, which are among the fastest-growing parts of the Pacific Northwest, have been constructed within recent years, with the result that a major portion of the workload in that area has shifted north and eastward making it possible to cover more substation equipment in a shorter period of travel time from Kennewick. Another major factor in locating substation maintenance crews is the fact that major substations, such as Ross, Olympia, Covington, Columbia, Salem, and Spokane have the most important and largest installations of substation equipment in their particular area and require a major portion of the maintenance crews' time. These stations are not only important from a service standpoint, but also consume a major portion of a crew's time, thereby eliminating need for travel or per diem.

Line maintenance crews are located at strategic points on the transmission system so that they will cover from an emergency standpoint the major strategic lines, as well as being in a position to handle maintenance on auxiliary facilities. For the most part, two-man crews are located at major sectionalizing switching points in order that outages may be isolated in the shortest possible time. They also perform normal system maintenance which does not involve a larger crew. Larger five- and seven-man crews are located at focal points, usually where several major lines converge, such as Ross, Coulee, Covington, Spokane, Salem, and Eugene. These crews are used for major maintenance work in handling hot line work or may be broken up on a temporary basis to perform minor maintenance activities in the area where they are stationed. Costs of travel and per diem have also been greatly reduced by the use of helicopters for periodic line patrols both for routine and emergency work. By this means the time in travel has been reduced.

In the location of both line and substation crews the relationship of the Administration system to major trunk highways is considered in order to take full

advantage of the accessibility of these highways to the Administration system and to the speed with which these highways permit emergency maintenance situations to be handled.

Radio equipment supplied to maintenance crews enables the power dispatchers and the supervisors to reach these men and dispatch them to critical points with the least loss of time and travel costs.

In summary, the major motives of the Administration in the organization of its maintenance crews are to obtain the fullest possible emergency coverage by means of establishing certain locations, reducing costs on normal preventive maintenance to a minimum, and reducing periods of outages so as to prevent serious loss in revenues and in essential services to its customers.

Senator CORDON. I understand the operation of traveling, but it is important.

Mr. RAVER. It is about $227,000 for operation and maintenance.

Senator HAYDEN. What is the remainder of the item made up of?

Mr. RAVER. The remainder is construction travel, $1,482,746.

Senator HAYDEN. Those are the only two items involved, either maintenance or construction?

Mr. RAVER. That is right. We have more work away from our home stations on transmission lines than the Bureau or the Army would have in building a dam because they are located at a definite spot; whereas, we are operating a system that extends over an extensive area.

Senator CORDON. Do you locate a maintenance crew in Eugene, Oreg., to serve that area?

Mr. RAVER. Yes; we do. We have maintenance crews located at a number of strategic points with respect to where the transmission system and main parts of it are located.

Senator CORDON. With respect to the larger item which is the balance for construction travel, explain that for the record, please. Do you mean by construction travel that this includes travel of your employees who are supervising construction, or does it represent local travel of those doing construction?

Mr. RAVER. It is both. We do a certain amount of construction work of our own. That involves travel of our own employees.

We also have to supervise all construction activities, whether they are done by our own people or by private contractors.

We have under way at the present time the largest construction program in the history of our operation in terms of numbers of jobs at different parts of the region that are going on constantly. That is where this travel comes in.

Senator HAYDEN. In the item "Travel," have you the cost of automobiles and the maintenance of automobiles?

Mr. RAVER. It does include that. We have an automobile pool. The maintenance of the cars in that pool is included in that cost.

Senator CORDON. I note you stated you had the largest construction program now in progress in the history of the Administration, and more jobs scattered out geographically over your system, yet you have been able to reduce your travel estimates better than $100,000 of your estimate of 1951.

Mr. RAVER. That will vary with the locations of these jobs, but part of it is due to a reorganization of our operation and maintenance locations and construction forces, which has been going on for a couple of years, and we are beginning to get some results from that.

TOTAL EMPLOYEES

Senator CORDON. The only other item mentioned in the House hearings where this reduction was made on the floor is a reference to the number of employees. This is a statement that appears in Mr. Ford's justification of his amendment on page 4413 of the House record, on April 24:

> The budget request for this item would provide 2,227 employees for the agency at an average salary of $4,026.
> In the current year 2,196 employees are provided for this agency, and in 1950 only an average of 1,605 were employed for the agency.

I cannot vouch for the accuracy of those figures. That is what appears in the quotation.

Would you comment on that?

Mr. RAVER. The figures I think are probably accurate. The 2,227 is a construction figure, average number of employees. Our total working strength as of March 31, 1951, is 2,975.

The figure that you give there does not include our operation and maintenance forces which would add 887 to that total.

Senator CORDON. How does that compare to last year and the year before?

Mr. RAVER. The total working strength 1 year ago was 2,301 compared to 2,975 as of March 31, this year. So there is an increase of 674 persons in the whole organization, both operation and maintenance and construction.

Senator CORDON. What portion of that is attributable to construction, and what portion operation and maintenance?

Mr. RAVER. Most of it is construction. May I break it down in more than one way?

Senator CORDON. Yes.

Mr. RAVER. The total working strength as of that same date for our annual employees is 1,820.

The total working strength of our hourly employees was 1,156.

Most of the increase you will find comes in the hourly employees in the construction category. The increase on the annual employees comes primarily in the engineering design category in connection with the design work for a greatly expanded construction program.

Senator CORDON. I had in mind the breakdown to indicate in what category lay the increase in personnel requested for 1952 as compared with 1951.

You answered the major portion of it was in the construction field.

Mr. RAVER. The actual increase in the operation and maintenance field was 72 out of that total.

Senator CORDON. I notice you have been looking at a schedule. That appears in the House hearings?

Mr. RAVER. Yes, sir.

Senator CORDON. At what page?

Mr. RAVER. Pages 154 and 155.

Senator CORDON. Then we can refer to that and I do not think that we need to go into this any further.

REDUCTION IN AMOUNT FOR SUPPLIES AND MATERIALS

I have noticed, Doctor, that last year you had $10,000,000, in round numbers, for supplies and materials. Your estimate for this year is $8,601,988, or a reduction of substantially $1,500,000.

That would indicate confirmation of your statement that your figures for the present estimate do not include any increase by virtue of increases in prices as a result of the emergency; is that correct?

Mr. RAVER. I think it probably does reflect or indicate that; yes.

Senator CORDON. For equipment, you have substantially the same for this year as last and for land and structures, I notice that you have an increase of substantially $5,600,000, or thereabouts.

Will you please explain the reason for that increase?

SUBSTATION INSTALLATION

Mr. RAVER. That is due to an increase in the amount of substation installation this year over last.

Senator CORDON. The term "land" shown in "land and structures" represents a minor portion of that total figure, does it not?

Mr. RAVER. Yes, sir.

Senator CORDON. What percentage would you estimate? I am sure it is minor.

Mr. RAVER. Land I believe runs around 10 percent of our total.

Senator CORDON. The major portion of that is represented in the new substations to be constructed or to progress in construction that is now going forward?

Mr. RAVER. That is right.

TOTAL AMOUNTS REQUESTED AND OBLIGATED

Senator CORDON. While your total request is $69,500,000, your total obligations for the year as requested were only $48,963,667, or an increase of about $3,000,000 over 1951.

The increase in the request clearly does not reflect an increase in expenditures, but represents the necessity this year of making payments on account of prior authorizations given by the Congress?

Mr. RAVER. Yes, sir; to pay for contract authorizations made last year.

Senator CORDON. With respect to the listed activities, which of the items numbered 1 to 25, under the heading "General, major, 230-kilovolt grid," which I understand means identification of the highest power transmission, represents the major basic, or, as it is sometimes termed, backbone transmission system of the Administration?

Are there any in the list that are not in that category?

Mr. RAVER. About—not in the first 25. I am just looking on down the list beyond that. The first group there are all in that category.

LINES UNDER CONSTRUCTION

Senator CORDON. Of that group, how many represent lines now under construction for which you are asking additional funds to continue construction.

Mr. RAVER. I would say all of them except No. 12, No. 16, No. 21, and No. 24.

Senator CORDON. What about No. 2?

Mr. RAVER. Also No. 2. That is a conductor change on an existing facility.

QUESTION AS TO CONDUCTOR CHANGE

Senator CORDON. I want an explanation with respect to the items. You say No. 2 is a conductor change. It is so indicated here. Just what is that and what is its necessity?

Mr. RAVER. Putting on a larger conductor in order to increase the capacity of the line instead of building another line.

The economics of it indicated that would be the practical thing to do.

Senator CORDON. In other words, by this installation you have increased the capacity of existing facilities for service?

Mr. RAVER. That is right.

Senator CORDON. A given facility can handle a greater volume of current by reason of this added conductor change?

Mr. RAVER. That is true. There was another reason that I should tell you about.

The conductor on this particular facility had developed some crystallization that our engineers did not like anyway. They were glad to get rid of it. We needed a larger conductor and the two things went together.

Senator CORDON. In other words, crystallization not only interfered with efficiency of the installation, but would include a threat of ultimate serious trouble?

Mr. RAVER. It included the threat of failure or breakage.

Senator ELLENDER. Does it mean you could use the same size wire and transmit more electricity?

Mr. RAVER. There is an increase in the size of the wire. This new conductor will be 800,000 circular mil as compared with the old conductor which is 500,000 circular mil.

Senator ELLENDER. I thought you were using the same wire.

Mr. RAVER. We use the same structures, the same insulators, but we have larger wire.

AVAILABILITY OF ELECTRICITY FOR ALUMINUM FACILITY

Senator ELLENDER. Senator, did you find out what the entire cost of this project would be to make this electricity available for this aluminum facility? The $3,672,000?

Senator CORDON. That is the total cost to the Government to make it available and it includes, according to the statements to the committee, not only the cost to handle it at the present time, but to handle it after the Bonneville Administration takes over the whole obligation of supplying the facility, and includes the cost of the facility in the area for normal growth and present need.

I also made inquiry with respect to the time when the total cost would be amortized from receipts accruing to the Government from its use.

The doctor is going to supply information on that.

Senator ELLENDER. I know that the cry from all over the Government is for more power. I presume the same thing prevails at Bonneville.

AVAILABILITY OF POWER FROM M'NARY DAM

Senator CORDON. The next item the doctor has identified as not being existing construction for which they were requesting an appropriation, is No. 12, the McNary-Big Eddy-Ross line.

Will you explain that, please?

Mr. RAVER. May I use the map?

Senator ELLENDER. Yes.

Mr. RAVER. The McNary-Big Eddy-Ross line is the one shown in red from McNary Dam to a point just below The Dalles, Oreg., called Big Eddy, which is one of the main switching stations in our basic grid system, and across the river running into the J. D. Ross substation at Vancouver, Wash.

This will be one of the main 230,000-volt transmission facilities to get power from the McNary Dam into the Portland area, which is one of the severe shortage areas.

Senator CORDON. When will McNary Dam first deliver power into the Bonneville system?

Mr. RAVER. In December 1953. The generating schedule on that is in my opening statement. McNary is December 1953, and by December 1954 will add 420,000 kilowatts of name-plate rating generating capacity which will be worth 483,000 kilowatts for peaking purposes in December and will be worth 415,000 kilowatts of firm year-round power.

Senator CORDON. In that instance the prime power is almost equivalent to the name plate or capacity of the generators installed?

Mr. RAVER. That is right.

Senator CORDON. That is new construction that is now well along and will be completed and the generators will begin to be installed in 1953?

Mr. RAVER. That is right.

Senator CORDON. This particular line represents one of the major basic backbone transmission lines in the new source of power to one of the major load centers; is that right?

Mr. RAVER. That is correct.

Senator HAYDEN. If I remember correctly, this installation of power is being undertaken by the Corps of Engineers.

Mr. RAVER. Yes; the dam is being built by them.

Senator HAYDEN. Do they install the generators?

Mr. RAVER. Yes, sir.

Senator HAYDEN. Your connection is after the power is generated. Then you transmit it and provide those facilities?

Mr. RAVER. Yes, sir. Our job is to time our transmission into the load centers so that when the generators come on the line that are put in by the other agencies, we will have a place to sell it.

Senator HAYDEN. While I am looking at that map I notice the green loop that comes down into southern Oregon and California. Has that been constructed?

Mr. RAVER. This line from Big Eddy south is partly built by the Pacific Power & Light Co. as far as Madras under an arrangement that when we complete this line here we can buy and take that line from them and operate it as a single system.

They constructed it for 230,000-volt ultimate operation even though they only need it for 66,000-volt operation themselves, so that we could

use it as a part of our 230,000-volt system south to Klamath Falls. This will save the company money and will not increase our costs.

The line has been surveyed. Materials have been ordered. We are trying to get the line in operation as far south as Redmond, which is a severe shortage area, by the fall of 1952, and complete it to Klamath Falls by the fall of 1953.

POWER DEMAND AT KLAMATH FALLS

Senator HAYDEN. How is the demand for power there at Klamath Falls?

Mr. RAVER. There is a demand for power at Klamath Falls.

Senator HAYDEN. Are both of those lines east of the mountain range, or one east and one west?

Mr. RAVER. One is east and one west.

Senator HAYDEN. Eastern Oregon gets some service from the line. It is so near to California have you made any arrangements for any exchange of power with the Reclamation Service from Shasta Dam?

Mr. RAVER. We have made some arrangements, but so far they are not going into effect, unless the Bureau of Reclamation is able to build a connection at Klamath Falls.

Senator HAYDEN. There was a proposal for a tie line?

Mr. RAVER. Yes, sir.

Senator HAYDEN. Was the idea simply that surplus power from one area could be transferred to the other?

Mr. RAVER. That is right.

The idea was that during the midnight hours to 6 o'clock in the morning, and week ends, holidays, and certain seasons of the year, we not only have generating capacity in those hours, at those times, but we have water at those hours and times which otherwise runs to waste.

We also have capacity in our transmission system in those same hours and same time. If we can find a market for that kind of power in terms of utility company operations, it is a very profitable business. There is a market for that kind of power in California for displacing steam. Steam plants that would operate in those hours, regardless, could be shut down or curtailed and oil saved by that kind of operation.

The reverse is also true, that there are times when there is surplus steam capacity there, that the plants are idle, perhaps spinning but not actually turning out energy.

With very little incremental cost they could turn out some steam energy and give it to us if we want it. We could close up generators at our dams, hold back our water for storage purposes as we would do if we were running into a dry water season in the fall, and that line would be worth 100,000 kilowatts of additional firm power which could be sold for defense industry of 100,000 kilowatt capacity in the Northwest simply by having the assurance that if you had to do it, you could get enough steam power back to hold our reservoirs and supplement our hydropower.

In other words, get the steam power under those conditions for holding reservoirs and supplementing our hydro during the winter season and to that extent have another 100,000 kilowatts of year-round power which would otherwise be interruptible.

Senator HAYDEN. I have heard that kind of exchange was between the Tennessee Valley Authority and the utilities on the east side of the

mountain. The report was made that it was highly advantageous to both parties.

Would that be your judgment about a situation of that kind, Mr. Raver?

Mr. RAVER. Yes; it is basically nothing new. The electrical industry is doing that kind of thing all of the time.

Senator HAYDEN. If there is steam generated power in California, I cannot quite understand where Reclamation comes into the picture because they have nothing but hydropower.

Mr. RAVER. If we tied it in with the Shasta Dam—that dam is tied in by the Pacific Gas & Electric Co. with their own system—you would be able to do a certain amount of firming up at Shasta Dam as well as saving oil costs.

I believe out of the total power that we could export, from two to six hundred million kilowatt-hours a year over that facility, depending on water conditions, we would save about 1,000,000 barrels of oil per year and add approximately $1,000,000 annually to the Treasury of the Government.

Senator HAYDEN. Actually the Pacific Gas Co. would be the generating agency?

Mr. RAVER. That is correct.

Senator HAYDEN. They would be paid in kind as you worked it out?

Mr. RAVER. That would be an arrangement between the Bureau of Reclamation and them. Our arrangement would be between the Bureau of Reclamation and ourselves.

Senator CORDON. How large a transmission line would you put in there? What capacity?

Mr. RAVER. Two hundred and thirty thousand volts with wood pole construction.

Senator CORDON. Is there not an interconnection through there now between the Pacific Gas & Electric Co. and the California Power Co.?

Mr. RAVER. Yes; they have an interconnection between themselves now.

Senator CORDON. Is that usable for that purpose?

Mr. RAVER. No.

Senator CORDON. Why?

Mr. RAVER. It is too weak a link.

Senator CORDON. What is its capacity?

Mr. MARLETT. Sixty thousand kilowatts. It is too weak a link to operate the large California system in parallel with the northwest power pool. They now have to operate separately.

Senator CORDON. Is that item in your appropriation, to build that interconnection?

Mr. RAVER. No, sir. That is in the appropriation request of the Bureau of Reclamation.

Senator HAYDEN. I understood it had been denied by the House.

Senator CORDON. It is denied twice by the House and the money spent despite it, apparently. The House seemed very critical and rather caustic about it and seemingly with reason.

The McNary-Big Eddy-Ross line I think you have covered. It is essential in order to get the use of the new generation which will come in from the McNary Dam in 1953; is that correct?

Mr. RAVER. That is correct, 1954 really. You will notice there is only $150,000 this year. We have some lines under construction there now to take care of the 1953 generation.

We are also getting ready at this time for generation for McNary in 1954.

DETROIT-CHEMAWA LINE

Senator CORDON. The next one is No. 16, which is Detroit-Chemawa. Please explain that.

Mr. RAVER. That line is an extension of the same 230-kilovolt grid for bringing power from McNary Dam, and also the Detroit Dam, into the Willamette Valley area and into the Portland area.

This red line located here on the map indicates the location of the line. This is the Detroit Dam under construction by the Army engineers at the present time.

The first generation comes in 1953.

Senator CORDON. That is a flood control structure with a power installation?

Mr. RAVER. That is correct.

You will notice there is also under construction as a part of this program a 230,000-volt line shown in green, coming from McNary Dam to Maupen and into the Detroit Dam and from there into our Albany substation.

There there is the 230-kilovolt line from Maupin into Detroit which will tie in at Maupen with a line from Big Eddy to Klamath Falls which, in turn, will tie in back to McNary and also to Grand Coulee Dam.

Senator CORDON. That is the sort of a tie-in that creates more power than the sum total that is generated at the several individual plants?

Mr. RAVER. Yes, sir. That is one of the purposes of the grid. The other is to get more reliable service by having more than one route.

This Detroit-Chamawa extension will thus give us two circuits from McNary Dam, one going into Albany by way of Detroit Dam, and one going into Chemawa which is farther north and really supports the southern end of the Portland area load.

Senator CORDON. That takes care of the load around the capital city of Salem?

Mr. RAVER. Yes.

It also takes power from the Detroit Dam, so there is a segment of this program under construction that ties in with the J. P. Alvey substation at Eugene, which will be the first part of it to be energized.

There is a serious power shortage in that area.

Senator HAYDEN. How do you get more net power out of a grid than you put into it? I do not understand that.

Mr. RAVER. We do it by getting the advantage of diversity in water flows in different watersheds, diversity in flows in different areas, diversity in time, for example, between the mountain region and the coastal region, which is an hour's difference in time, which gives you some diversity between load and resources. By having a grid tying all of these generating sources with their different water conditions together with load conditions which are different, you are able to get a better utilization of your power than you would if you have a separate generating facility isolated for every one of your loads.

Senator HAYDEN. I can understand that, but I did not see how you could get out net more than you put in.

Mr. RAVER. You actually do. That is a basic economic factor in integration of generating plants by transmission.

Senator HAYDEN. I can understand utilization.

COOS BAY AREA

Senator CORDON. The next item, Doctor, is No. 21, which is the Coos Bay area. Will you locate that on the map and explain what the necessity for it is?

Mr. RAVER. I am looking for another part of that. The southwest Oregon loop is just above it, item No. 20, and should be explained in connection with that.

One of the problems over in this Coos Bay area, is that it is an awfully long way from our existing generating facilities and as fast as new generating facilities come in we are trying to get our system in shape so the power will flow in there from the nearest source of supply.

Of course, at Roseburg, the California–Oregon Power Co. is getting its generation, new generation of its own, in shape to pour into the Roseburg area and relieve that situation.

We are trying to take care of the situation on the other side of their system by getting this line in so that Roseburg will be relieved if we can link this part of the loop from Eugene to Roseburg with the 230,000-volt facility and over the Coos Bay with the 230,000-volt facility.

When that is completed we will have the best power service that we have ever had on the coastal area with power flowing in there from the nearest generating source of supply.

There is existing here now from Eugene to the south to Roseburg and from Roseburg over to Coos Bay a 115,000-volt transmission facility owned by the California-Oregon Power Co. This facility is old and will have to be rehabilitated in due course of time. It should be done rather soon.

In conversations with the company we have discussed taking over this existing 115,000-volt facility and using that right away to put in a 230,000-volt facility on the same right-of-way that will increase the carrying capacity on that right-of-way about four times to the advantage of their customers throughout that area. We have not yet fully decided whether it is better to replace the existing 115-kilovolt line with a 230-kilovolt line or to build the 230-kilovolt line along side of it.

Senator ELLENDER. Have you a dam over here at Klamath Falls?

Mr. RAVER. No, sir.

Senator ELLENDER. So that you bring electricity to that point from which facility?

Mr. RAVER. From McNary Dam.

Senator ELLENDER. What is that distance?

Mr. RAVER. It is 250 miles.

Senator ELLENDER. Then you take it toward the coast and then up into the area above it, but you have no dams there, either, do you?

Mr. RAVER. No. We would tie in with facilities of other utility companies. We tie in our system with the system of the existing private companies.

Senator ELLENDER. Under a wheeling contact?

Mr. RAVER. To some extent, but it is primarily this idea of integrating our system so as to get more power out of the existing generating facilities of the companies as well as our own.

Senator ELLENDER. You mean more use for it?

Mr. RAVER. That is right.

In other words, we conserve them along the way down here. Our power would be used primarily at this (the north) end of the system and displace to that extent power they are now sending north from Klamath Falls.

You might use it in Klamath Falls where it is needed.

Then there is a possibility also that the California-Oregon Power Co. will build a very large new hydroelectric development of their own here on in the Klamath Falls area. If that is done our 23-kilovolt line to Klamath Falls can be used to integrate with these new generating facilities and add about 100,000 kilowatts more power to the area than would otherwise exist.

Those plans are coming along and the Defense Electric Power Administration I think will go along with it.

Out of that kind of a set-up we would add to this region and to the Klamath Falls area not only the power supply that the California-Oregon Power Co. will put in there in the form of new generation, but our integration studies show we will add about 100,000 kilowatts in addition by integration alone.

AVERAGE LIFE OF LINE

Senator ELLENDER. What about the amortization of this? What is the average life of a line, let us say, from Klamath Falls northward?

Mr. RAVER. We figure these lines from 40 to 50 years.

Senator ELLENDER. Your charge is sufficient to cover all costs and carry everything back to the Government with interest?

Mr. RAVER. That is right. We have a set of percentages applying to different types of construction. This line, incidentally, has been changed in design to Klamath Falls. Our original plans were for steel, but the steel shortage has indicated we should build it with wood poles which will mean the annual cost on that line goes up because the life of the wood poles is shorter than the steel ones.

I think we figure about 35 years for the wood poles but the conductor would have the same life as that on a steel tower line.

Senator ELLENDER. What interest did you pay back to the Government?

Mr. RAVER. Two and a half percent on all except Grand Coulee which is 3 percent by law.

Senator HAYDEN. Doctor, the committee will now stand in recess until 2 o'clock this afternoon.

(The committee reconvened at 2 p. m.)

Senator HAYDEN. The committee will be in order. You may proceed, Mr. Raver.

EXTENSION OF LA GRANDE-BAKER, IDAHO

Senator CORDON. The next item is the La Grande-Baker.

Mr. RAVER. That is an extension of a 230,000-volt line, item No. 3 being the McNary-La Grande.

As far as our present situation is concerned, it is a part of the integration program. We can integrate the entire Bonneville grid system with the entire grid system and generating facilities of the Idaho Power Co. at Baker. We cannot bring about that integration at La Grande with the present facilities that exist between Baker and La Grande. There is an existing line there now owned by the California-Pacific Power Co. that, as I remember, is a 66,000-volt line and would have no integration benefits to speak of, tied in with our 230,000-volt facilities.

The facilities of the Idaho Power Co., however, have been greatly strengthened within the past 2 or 3 years all through this southern Idaho territory and they have quite a program of new generation facilities and installations of their own.

The Federal Government also has a program of new installations, including the Black Canyon Dam, here, and facilities that are already in existence, such as Anderson Ranch and others.

The Palisades Dam is a proposed dam that should be brought into production as rapidly as possible. Regardless of where that power flows, whether it flows into the Idaho power system or should eventually be tied in directly with the Bonneville system, the integration can be brought about.

The integration benefits at the present time are not high. They amount to somewhere between 8,000 and 12,000 kilowatts of additional firm power by making that interconnection. When you are scraping the barrel for any additional power supplies, that is still important power for us but the integration benefits in the future as these other projects come in are very important.

Senator CORDON. How much money do you ask for that?

AMOUNT REQUESTED

Mr. RAVER. We ask $54,000, which is primarily planning and engineering money for this year.

Senator CORDON. The La Grande-Baker line is or is not in your view at the present time an authorized project?

AUTHORIZATION PENDING

Mr. RAVER. It is not an authorized project until it is passed by this Congress, as I understand it.

Senator CORDON. In other words, the small amount of money here while only applying to perhaps the beginning of planning, would nevertheless represent the authorization for the construction at some future time?

Mr. RAVER. That is correct. That would be the way we would interpret it.

Senator CORDON. That, I believe, completes the major 230,000-volt grid.

There are some other minor items in the coastal area, and in southwest Oregon. Here and there, there are a few that are new in the Spokane area, central Washington, and eastern Oregon, a very few, but I would suggest the doctor furnish a short statement for the record with reference to each of those that represent new construction.

Mr. RAVER. Very well, sir; we will do that.

(The information requested is as follows:)

BONNEVILLE POWER ADMINISTRATION, 1952 FISCAL YEAR PROGRAM

NEW CONSTRUCTION ITEMS

Item I–2. Grand Coulee-Midway No. 2 conductor change, $1,143,000

It is proposed to replace the existing 500,000 circular mil copper-equivalent conductor on Grand Coulee-Midway No. 2 line with a conductor equivalent to 800,000 circular mils to increase the capacity of the circuit for transmission of power between Grand Coulee and Midway substation. It is planned for completion by October 1952.

Item I–12. McNary-Big Eddy-J. D. Ross, $150,000

This line will be a 230,000-volt facility to transmit McNary power to the general Portland area. The Big Eddy-J. D. Ross section will be constructed using 800,000 circular mil copper-equivalent conductor and will be capable of operating at a voltage higher than 230,000 volts when it is necessary to make such a change in order to provide additional carrying capacity. It will be needed by the summer of 1955 when McNary will have a total-installed capacity of 560,000 kilowatts. Planning funds only are requested in the 1952 fiscal-year program.

Item I–16. Detroit-Chemawa, $1,529,000

This facility consists of 47 miles of 230,000-volt transmission line and a substation at Chemawa. The facility is required to increase the transmission capability into the Salem area and to afford additional transformation capacity as the present 115-kilovolt facilities are not adequate to handle the load increase in this area. It is scheduled for completion by December 1954, at which time the load on the facility will be approximately 125,000 kilowatts.

Item I–21. Coos Bay area service, $100,000

The southwest Oregon coastal area is now served by a 115,000-volt transmission line from Eugene to Coos Bay, and an additional 115,000-volt line is under construction between Bandon and Gold Beach. These facilities are insufficient to provide for the needs of the coastal area, and it is therefore proposed to construct a 230,000-volt line from Roseburg to Coos Bay in order to provide the necessary transmission capacity into this area. It will also be necessary to complete the line from the J. P. Alvey substation to Roseburg, this latter section being a part of the southwest Oregon loop service which is already authorized. The line will initially be operated at 115,000 volts and converted to 230,000 volts when necessary. It is proposed for completion in November 1954. Planning funds only are requested in 1952.

Item I–23e. Pendleton area service, $293,000

This facility will be a 20,000 kilovolt-ampere substation to be known as the Roundup substation and a short tap line to connect it to the McNary-La Grande line now under construction. This facility is needed to provide reliable service to both the Pendleton and Walla Walla areas since the present feed into Pendleton is from Walla Walla substation that is now overloaded. It is proposed for completion by December 1953.

Item I–24. La Grande-Baker, $54,000

This line will be a 230,000-volt facility with a substation at Baker. It will be an extension of the McNary-La Grande line and will provide for an interconnection with the Idaho Power Co. at Baker in order to integrate the facilities of the Bonneville Power Administration with those of the Idaho Power Co. Benefits

from this integration will range from 8,000 to 30,000 kilowatts. The line is proposed for completion in December 1954. The line will also provide for emergency back-up and interchange capacity between the two systems.

Item IA–5b and d. Shelton-Bremerton No. 2, $460,000

The Allyn-Kitsap line and Kitsap switching station were previously authorized. New facilities proposed in 1952 are Shelton substation additions and the Shelton-Allyn line. This entire facility is necessary to serve the Bremerton area, which includes service to the naval shipyard at Bremerton. Service to this area over the previously authorized facilities depends upon an interconnection with the city of Tacoma. This should be strengthened by extension of the facility to Shelton in order to provide sufficient transmission capacity.

Item IB–15. Astoria substation additions, $150,000

It is proposed to install an additional 12,000 kilovolt-ampere transformer bank in the existing Astoria substation in order to provide for the load requirements of the Pacific Power & Light Co., the Tongue Point Naval Station, the Coast Guard facilities adjacent to Tongue Point, and the West Oregon Electric Cooperative which will supply power to the Maritime Commission's new mooring basin also adjacent to Tongue Point, in addition to its other load. It is planned for completion in July 1952.

Item IC–10. Lebanon-Springfield, $283,000

After completion of the 230-kilovolt Detroit-Albany line in 1953, this 115,000-volt facility will serve as back-up protection to the existing 115-kilovolt Albany-Eugene-Goshen line. It will also provide adequate 115-kilovolt tie capacity between the two points to allow more freedom of operation. It is scheduled for completion by November 1953.

Item IC–11. Middle Fork-Willamette River projects, $25,000

These funds are requested in 1952 for planning of facilities to provide for transmission of power from the Lookout Point, Dexter, and Hills Creek projects to the J. P. Alvey substation. The line from the Hills Creek area to the Lookout Point area is presently under construction by the Lane County Electric Cooperative to serve its own loads in the Hills Creek area. By agreement with the Bonneville Power Administration, the line is being constructed for 115,000-volt operation instead of 69,000-volt operation in order to provide for capacity to be used by the Bonneville Power Administration when the Hills Creek plant comes into operation.

One 115,000-volt circuit between Lookout Point and the J. P. Alvey substation is planned for completion by November 1953 to connect with the Lookout Point-Hills Creek line. Ultimately a second circuit and switching stations at Lookout Point, Dexter, and Hills Creek will be necessary when the power production facilities come into operation.

Item IIC–12. Columbia Basin service, $664,000

It is proposed to construct a 150,000 kilovolt-ampere substation at Rocky Ford on the existing Grand Coulee-Midway line No. 1. This substation is needed to supply the Columbia-Ephrata-Moses Lake 115,000-volt line. It will also provide relief for the facilities at Midway and Columbia. Present loadings in the Columbia service area are in the order of 35,000 kilowatts and will be in excess of 100,000 kilowatts by 1954. The substation is proposed for energization by November 1954.

Item IIC–23a to c. Franklin County, $220,000

This facility will consist of a 15-mile, 115,000-volt line between Benton and Scooteray, with a terminal at Benton and a 6,000 kilovolt-ampere substation at Scootenay. This facility will provide power for irrigation pumping and to United States Bureau of Reclamation contractors working in that area. It will also provide for service to settlers in this area on land reclaimed by the Columbia Basin project. Estimated loads are 1,830 kilowatts in 1952 and 4,765 kilowatts in 1953. The facility is planned for energization in November 1952.

Item IIC–27. Tygh Valley substation, $62,000

This facility is a proposed 3,000 kilovolt-ampere substation to be connected to the Pacific Power & Light Co.'s 66-kilovolt transmission line in the vicinity of Tygh Valley. It will serve the Wasco Electric Cooperative, and is scheduled for energization in September 1952.

Item IV–2, b, c, d, and f. Communication facilities, $728,000

These items are additions to communication facilities for hydrologic reporting, telemetering, supervisory control, and other communication requirements. These items are additions to communication facilities previously authorized, and are necessary for system protection and for efficient and economical operation of the power system network.

The program also includes a number of small facilities, principally minor additions to existing facilities but which are considered to be new work in 1952.

BONNEVILLE GRID FOR SOUTHERN IDAHO

Senator HAYDEN. There was a feeling at one time that it would not be advantageous to the State of Idaho to have a connection with Bonneville power, or have that cheap Bonneville power get in there because of the cost of power to be produced by projects constructed in Idaho. The latter could not possibly be as cheap as the Bonneville power.

Does that situation still exist? The dams to be built are multiple-purpose dams, for irrigation and power. They would produce some power, but they would not produce it as cheaply as you sell it.

Mr. RAVER. I recognize that there is that point of view in southern Idaho and it has been there for many years.

Senator HAYDEN. I don't mean they wouldn't get comparatively cheap power, but it would not be 2-mill or 3-mill power like you give.

Mr. RAVER. That is tied up by the fact that in that area particularly, as well as some of the other areas in the Northwest, the economy of that region is tied definitely to an expansion of irrigation. A part of the feeling has been that if power from the Bonneville grid came in under the uniform rate schedules of the Bonneville Administration, at a price cheaper than the power could be generated at some of these reclamation projects, it would tend to stop those reclamation projects or prevent their being built.

That was one of the first arguments that I faced in my administration, in southern Idaho, at a meeting in Boise in the winter of 1939. I was not too familiar with it but I made this statement: That it was not the purpose of the Federal Government to do anything to upset or interfere with the economy of any area. It was rather the opposite point of view—that the Federal Government was interested in aiding in any way that it could in bringing about a stronger and better economy for the region.

We had no intention of doing that and we have never been down in there with our people or otherwise. We have no intention of trying to do anything that would upset their economy.

I do not agree with their point of view as to low rates, however. I think it is an erroneous point of view by any measure, but as long as they have it, I guess they will have to live with it as long as they want it.

Senator HAYDEN. The average per kilowatt-hour throughout the United States is what—around 5 mills?

Senator CORDON. Mr. Chairman, can I ask whether you mean the average rate for wholesale? Do you mean the average amount received by the generator and original seller?

Senator HAYDEN. Yes. For instance, they talk about 5-mill power in the Missouri Basin, generally.

What is the average rate the country over? You are very much cheaper, I know.

Mr. RAVER. I do not know what the average is because it is very difficult to get a wholesale average, but I suppose it is probably at least twice our cost.

PAYMENT OF IRRIGATION SUBSIDY OUT OF POWER REVENUE

Senator HAYDEN. Now the theory, of course, as far as these irrigation developments are concerned in Idaho is that if there is a rate for power that is comparable to what is paid in the rest of the United States, and it is comparatively cheap power, there could be some subsidy to pay for their irrigation development. Why do you say that is the wrong idea?

Mr. RAVER. Because we are doing the very same thing in the State of Washington in connection with the whole Columbia Basin development. We are only charging 2 mills wholesale and yet we are subsidizing that irrigation project. The present subsidy, I think, has reached the point of about $450 million out of power rates. We have to charge a rate that will cover that subsidy, anyway.

Now the question is, Do you isolate southern Idaho from the rest of this system so that they operate purely on their high-cost power, or do you tie this region in as one watershed and give these people the benefits of the profits we are making on these low-cost dams in the rest of the region, on power, even though to do that in southern Idaho probably would add some increment of cost to the power charge, the wholesale rate, for the entire rest of the region.

The reason I think it is erroneous from their point of view, is that they can have the low power rates and irrigation as well and the rest of the region is really going to subsidize them out of the power profits downstream and the rest of the region ought to be objecting to it rather than the Southern Idaho people.

MONTANA POWER CO. CONTRACT

Senator HAYDEN. Then there is the other situation that is shown on the map. This deal that you made with the Montana Power Co. to take care of their situation west of the Rocky Mountains. Now that is a completed transaction, I understand.

Mr. RAVER. That is right.

Senator HAYDEN. What do they pay?

Mr. RAVER. They pay our standard rate.

The power delivered to them is at Anaconda, Mont. That is the point of integration with the entire Montana Power system and it has tremendous values to us as well as to Montana as an integration item right there at Anaconda, just as it would at Baker with the Idaho Power Co. as far as integration is concerned.

The company has the benefits of that as well as Bonneville.

Senator HAYDEN. You have made a 5-year contract with them?

Mr. RAVER. We made a 5-year contract with the Montana Power Co., which is a firm, 5-year contract. There are provisions for extending it from year to year after the first 2 years of operation so it cannot be canceled at any time except upon 3 years' notice. If everything is all right, we will extend it after the second year and it will be a 6-year contract. If they extend it after the third year, it is a 7-year contract, etc.

AMORTIZATION OF IRRIGATION SUBSIDY

Senator ELLENDER. A moment ago you spoke of a $450 million subsidy. What period do you cover in that amount?

Mr. RAVER. That is a very good question, Senator. The period that we would have to use to cover it on the present rate structure at the present time would be about 100 years.

Senator ELLENDER. What would become of your plants by that time? Are you amortizing as you go?

Mr. RAVER. We are amortizing the plants on a fifty-year basis, but the question of paying out this irrigation subsidy requires a longer period of time if we are to cover, without increasing our rates.

Senator ELLENDER. As I understand, the cost of reclamation is collected without interest?

Mr. RAVER. That is right.

Senator ELLENDER. That means that the Government is expending whatever it costs for reclamation, and to get the money back at 100 years without interest. Is that what it amounts to? How does that subsidy work? Do you mean you pay to carry the water to them or a portion of them or exactly how does it work?

Mr. RAVER. Well, we simply adjust our rates for power in accordance with an agreed repayment schedule.

That agreed repayment schedule so far as this present project is concerned, lies in this area here (indicating), for irrigating about one million acres of land.

We have had to extend the pay-out period in order to meet our over-all eventual pay-out requirements.

Senator ELLENDER. You mean you have to extend it so as to pay less per year?

Mr. RAVER. We pay the same amount per year. We have an agreed payment per year under the schedule that we worked out before we ran into these increasing prices.

Senator ELLENDER. Did you have to get legislative authority to do that?

Mr. RAVER. No. Our attorneys maintain that the Reclamation Act under which we operate does not limit us to 50 years. It limits us to a reasonable period for pay-out.

Senator HAYDEN. The amount to be paid by the settler is based upon estimated income he can earn from the land. If that would not pay for the project then power picks up the difference; is that it?

IRRIGATION CONTRACTS

Mr. RAVER. That is right and the settlers' contracts have already been drawn on a certain basis per acre. The inflation does not affect them. It affects only the power consumer who is paying the difference and on that basis since it is an inflation in costs we have simply extended the schedule of time until such time as we adjust our rates, which we feel we will have to do anyway.

Senator HAYDEN. What was the charge per acre the settlers paid?

Mr. RAVER. It is an average, as I remember, of about $85 per acre. It will be higher for the better land and a little lower than that for the marginal land.

Senator ELLENDER. For what period of time?

Mr. RAVER. He has 40 years after the first 10 years of his operation.

Senator ELLENDER. That $85 charge is for what? For the whole period, per year, or per month, or what?

Senator HAYDEN. It is the construction charge.

Mr. RAVER. That is his responsibility on investment. Of this total investment that has to be repaid for irrigation works his responsibility is $85 an acre and he repays that without interest over a 40-year period beginning ten years after he settles.

Senator ELLENDER. Now what is the difference between the $85.00 and the real cost?

Mr. RAVER. The difference is $450 million at the present estimates.

Senator ELLENDER. On a per-acre basis what does that amount to?

Mr. RAVER. That would be $450 an acre.

Senator ELLENDER. What was the period of repayment before you made this change?

Mr. RAVER. Fifty years.

Senator ELLENDER. Will you put in the record a memorandum showing the authority you had to do that. That simply means that this $450 million instead of being made up in 50 years will have to be paid in 100 years.

Mr. RAVER. We would very much like to supply that for the record. I have one here that is up to date that shows exactly where we stand on pay-out in all parts of our program, including this one.

(The information requested is as follows:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D. C., September 10, 1945.

The honorable the SECRETARY OF THE INTERIOR.

MY DEAR MR. SECRETARY: By a joint memorandum of May 28, which you submitted to me on May 31, the Director of the Division of Power and the Commissioner of the Bureau of Reclamation recommended that certain legal questions raised therein be submitted to me for an opinion. The memorandum summarizes the holding in my opinion (M. 33473) approved by you on September 29, 1944, concerning the minimum legal requirements for rate schedules to be established for the sale of electrical energy from the Grand Coulee Dam, Columbia Basin project, under subsection 9 (c) of the Reclamation Project Act of 1939 (53 Stat. 1193, 43 U. S. C. sec. 485),[1] and concludes that two additional questions require answer in order to determine "the minimum revenue requirements." The first question is as follows:

"Within what period of time must there be returned to the United States—

"(*a*) The estimated construction costs properly allocated to power?

"(*b*) The estimated costs, if any, properly allocable to purposes other than power but which are allocated to be returned from power revenues (i. e., the subsidy)?"

The memorandum refers to the fact that the joint report of the Bonneville Power Administration and the Bureau of Reclamation on the allocation and repayment of the costs of the Columbia Basin project, approved by you on January 31, states that no period for amortization (i. e., repayment) is expressly fixed by law, and that the implicit legal requirement would appear to be that costs be amortized within a reasonable period, and of course, within the useful life of the project. The memorandum states that since the repayment period chosen in the Columbia Basin allocation report coincides with the repayment period fixed by law for the water users (40 years, plus the development period, if any), the explicit question of the maximum length of the repayment period or periods for power

[1] The summarization reads: "To the end of producing revenues sufficient to return to the United States in addition to estimated operation and maintenance costs of the commercial power system, all estimated construction costs allocated to be returned from power revenues (i. e., estimated commercial power system construction costs plus subsidy, if any) the required minimum factors which rates for the sale of power must return, stated on an annual basis, are three percent of the construction investment properly allocated to power and such additional amounts, under the caption 'other fixed charges,' as are needed for the purpose of providing revenues sufficient to meet these costs."

construction costs and subsidy, if any, did not have to be considered. It accordingly was deemed advisable to present the question for formal determination by the Solicitor.

It is my opinion, answering part (*a*), that there is no specific statutory requirement with respect to the period of time within which power construction costs are to be repaid. It accordingly appears that there may be established a period of time based upon what is generally regarded in similar undertakings as a reasonable repayment period, within the useful life of the project, taking into consideration the circumstances of each individual project. Answering part (*b*), it is my opinion that the repayment period for that part of the estimated costs properly chargeable to irrigation but beyond the ability of the water users to repay (the irrigation subsidy) may be established in a manner similar to that established for the repayment of power construction costs.

A review of the Reclamation Project Act of 1939 and related legislation discloses no provision specifying a time within which repayment of construction costs allocated to be repaid from power revenues must be made. Such repayment provisions as are contained in the act refer to repayments to be made under water service contracts with municipalities (subsec. 9 (c), first sentence), or water users (subsec. 9(d)), both types specifying repayment within 40 years. The legislation is silent with respect to the length of the repayment period within which the Government is to repay to itself "the part of the estimated cost which can properly be allocated to power and probably be returned to the United States in net power revenues" (subsec. 9 (a) (5)).

The fact that no period of time was specified within which there was to be accomplished the repayment of the amount properly allocable to power appears not to have been an oversight. Such meager records as are available on the legislative history of this phase of the 1939 act disclose that the matter of a repayment period was considered. In a preliminary draft, dated March 27, 1939, of the controversial fourth sentence of the proposed subsection 9 (c), the Department provided a specific period of time within which such repayment was to be effected. The preliminary provision was to the effect that any sale of electric power or lease of power privileges made by the Secretary in connection with the operation of any works constructed under the Federal reclamation laws, "shall be at such rates as in his conclusive judgment will produce power revenues, which shall be covered into the reclamation fund, sufficient to return in forty years with three and one-half per centum of interest, an appropriate share, as determined by the Secretary, of that part of the construction costs allocated by the Secretary to power: * * *" As finally approved, the provision read as follows:

"* * * Any sale of electric power or lease of power privileges, made by the Secretary in connection with the operation of any project or division of a project, shall be for such periods, not to exceed forty years, and at such rates as in his judgment will produce power revenues at least sufficient to cover an appropriate share of the annual operation and maintenance cost, interest on an appropriate share of the construction investment at not less than 3 per centum per annum, and such other fixed charges as the Secretary deems proper: * * *"

Differing circumstances exist with respect to the various project undertakings. A repayment period suitable for one project might not be suitable for another. The solution apparently decided upon was to leave to the discretion of the Secretary of the Interior the determination of an appropriate time within the useful life of each project during which repayment should be required. The 40-year limitation imposed by the provision as finally approved clearly applies to the duration of contracts to be entered into for the sale of power or leases of power privileges in connection with the operation of power projects, and not to repayment of the project costs.[2]

I accordingly conclude as to part (a) that there is no specified statutory period within which the repayment of costs allocated to be repaid from net power revenues must be made, and that the repayment period therefore may be such as the Secretary of the Interior in his discretion shall determine to be proper to effect repayment within the useful life of each project.

[2] This interpretation is consistent with the general policy of the Congress as more expressly indicated with respect to the marketing of surplus energy from the Bonneville Project. In section 7 of the Bonneville Project Act (50 Stat. 731, 16 U. S. C. sec. 832f), it is provided that rate schedules shall be established to amortize the Government's investment "over a reasonable period of years." Pursuant to this provision, a 50-year amortization period was established by the Federal Power Commission in its allocation order issued June 26, 1945. Section 5 (a) of the Bonneville Project Act authorizes the making of power sales contracts with a maximum term of 20 years. This act indicates a legislative policy of limiting the term of contracts to specified periods, thus giving the Government and purchasers an opportunity to negotiate suitable new contracts, but allowing the over-all amortization period to vary with particular projects depending upon what is reasonable in the particular case.

The portion of the costs "properly chargeable to irrigation but which are beyond the ability of the water users to repay within the statutory repayment period" (the irrigation subsidy), is conceded to constitute "part of the estimated cost which can properly be allocated to power and probably be returned to the United States in net power revenues." Since it clearly is not intended to be regarded as an irrigation charge required to be repaid by the water users, it accordingly is not governed by the repayment period applicable to such charges. It is a charge, in addition to the power construction costs, which is required to be repaid from power revenues, if the project is to meet the test of feasibility laid down in section 9(a) of the Reclamation Project Act of 1939. I accordingly conclude as to part (b) that, as in the case of power construction costs, no specific statutory repayment period is prescribed for the return of such charge and the repayment period accordingly may be such as the Secretary of the Interior in his discretion shall decide to be proper for repayment within the useful life of each project.

The second legal question is as follows:

"Is the estimated construction investment properly allocated to power upon which the three percent factor is calculated subject to diminution in any manner by reason of net revenues being applied, under the Hayden-O'Mahoney amendment,[3] against that construction investment, and, if so, to what extent?"

It is my opinion that the estimated power construction investment constituting the base upon which the 3 percent interest element in the rate schedule is calculated is not subject to diminution in any manner by reason of any revenues being applied, under the Hayden-O'Mahoney Amendment, against that construction investment.

Four views are submitted as having been advanced on this question:

"(*a*) The 3-percent return (as distinguished from the return, if any, for 'other fixed charges') is required upon the construction investment without reduction, until the total return equals the investment, after which it may be discontinued.

"(*b*) The 3-percent return (as distinguished from the return, if any, for 'other fixed charges') is required upon the construction investment without reduction as long as power is sold.

"(*c*) The 3-percent return (as distinguished from the return, if any, for 'other fixed charges') is required only upon the construction investment reduced by that portion of the total power revenues that have been collected and applied to repayment of the construction investment.

"(*d*) The 3-percent return (as distinguished from the return, if any, for 'other fixed charges') is required upon the construction investment reduced by the amount by which that portion of total power revenues previously collected has exceeded the 3-percent return and has been applied to repayment of the construction investment."

Views (*a*), (*b*), and (*c*) are self-explanatory. View (*d*) assumes that for some reason (e. g., unanticipated volume of sales), net power revenues in amounts greater than 3 percent of the investment as originally calculated may become available for application against repayment of that investment, and asks, as I understand it, whether the annual interest calculation in such event could be made on the investment base reduced by the revenues derived from the excess over the 3 percent interest element. Since there is involved the same basic question posed in view (*c*), namely, whether the 3 percent may be calculated on a reduced investment base, the two will be considered together.

View (*b*) in my opinion is the only one for which there is authoritative support For the reasons stated in my opinion of September 29, 1944 (M. 33473), this conclusion necessarily is required. Since that opinion supports only view (*b*), and therefore precludes acceptance of views (*a*), (*c*), and (*d*), it appears advisable to review those portions of it which established unequivocally that not only is the interest element of the rate schedule to continue so long as power is sold, but also that the "appropriate share of the construction investment" upon which the 3 percent element of the rate schedule is to operate is the power construction costs and not an amount representing those costs on an annually diminishing basis.

On page 6 it was stated that:

"* * * I believe that a proper interpretation of section 9 of the Reclamation Act of 1939 and the Hayden-O'Mahoney amendment to the Department's Appropriation Act of 1939 require that the minimum rate schedule to be such as to produce [on an annual basis] revenues sufficient only to meet in addition to the return for operation and maintenance costs, *an amount equal to 3 percent of the power construction costs* with the proviso that if total revenues thus produced

[3] Act of May 9, 1938, 52 Stat. 291, 322, 43 U. S. C. sec. 392 (a).

are insufficient to repay all costs allocated to power to be repaid by power revenues, 'other fixed charges' must be included in the rate schedule to produce revenues sufficient to repay such costs. * * *" [Emphasis supplied.]

On page 7 the opinion stated:

"* * * It appears, therefore, that there is nothing in the act of 1939 to prevent the Secretary from fixing rates sufficient to meet 'an appropriate share of the annual operation and maintenance cost,' *interest on 'an appropriate share of the construction investment' at 3 percent per annum* and 'other fixed charges' sufficient to retire all construction costs to be returned from net power revenues. [Emphasis supplied.]

* * * * * * *

"The Hayden-O'Mahoney amendment deals expressly with the disposition of power revenues. *It contains the specific provision that all revenues derived from the sale of power 'shall be covered into the reclamation fund.' No reservation of any amount for the payment of special accounts,* such as interest in the form of a 'profit' to the United States, *is made.* It is provided that *only after net revenues* derived from the sale of power developed in connection with any such projects *shall have repaid* those *construction costs* of such project *'allocated' to power to be repaid by power revenues* (power construction costs plus subsidy) therefrom shall any part of said net revenues derived from the sale of power developed in connection with such projects go to the United States. Then, by specific instruction, it directs their disposition by providing that they *'shall, after the close of each fiscal year, be transferred to and covered into the General Treasury as "miscellaneous receipts." ' No clearer reflection of congressional intention with respect to the application to be made of revenues derived from irrigation power undertakings could be found.* There appears to be no conflict, therefore, between the Hayden-O'Mahoney amendment and section 9 of the act of 1939, and *I find nothing in either act which would require the Bureau of Reclamation to change what appears to be its past practice with respect to the application of power revenues. That practice appears to have been to retain in the reclamation fund, as a part of net power revenues, collections representing the interest element, where, it is reasonable to presume, they have been available for application against reimbursable costs not otherwise paid.* This practice was in accord with a number of statutes dealing with specific projects which called for the application of all revenues from power to the credit of the projects. * * *" [Additional emphasis supplied.]

In the original joint submission of questions which resulted in my first opinion the term "an appropriate share of the construction investment" was conceded to refer to the power-construction costs. That view was found to be supported by the history and related legislation affecting reclamation power projects and for that reason will not be further discussed here.[4]

Clearly it was intended by the Hayden-O'Mahoney amendment that there should be continuing revenues flowing annually from reclamation power projects which, after accomplishing the payment of the costs allocated to power to be paid from power revenues (power construction costs plus subsidy) should thereafter, at the close of each fiscal year—not be retained in the reclamation fund, reduced by virtue of a diminished base, discontinued, or otherwise diverted, but—be transferred and covered into the Treasury as "miscellaneous receipts." The minimum requirements of the rate schedule include two elements the revenue from which is earmarked for specific application (operation and maintenance costs). The only element, assuming a case where a rate schedule would reflect only the minimum legal requirements (and "other fixed charges" would not be involved), which could supply the "net revenues" which at the end of each fiscal year after full repayment of costs allocated to be paid from power revenues "shall * * * be transferred to and covered into the General Treasury as 'miscellaneous receipts'," would be the interest element.

If the views expressed in (*a*), (*c*), and (*d*) were to be seriously entertained, there would result a negation of this obvious intention and purpose of the Hayden-O'Mahoney amendment, a statute which my first opinion concluded necessarily must be construed in conjunction with the provisions of the Reclamation Project Act of 1939 in the determination of the application or disposition to be made of the revenues authorized by the 1939 act to be collected, since whether the interest element were discontinued entirely after the revenue return equaled the original costs allocated to power to be paid therefrom (view (*a*)), or were constantly lessened on a diminished balance of the investment basis, as proposed by views (*c*) and (*d*), there would remain either nothing under view (*a*), or only a perpetually diminishing but never ending amount under views (*c*) and (*d*), which "after the

[4] See p. 5, footnote 5, of Opinion M. 33473, approved September 29, 1944.

close of each fiscal year [shall] be transferred to and covered into the General Treasury as 'miscellaneous receipts'."

In my previous opinion, I concluded that "other fixed charges" were necessary under subsection 9 (c) of the 1939 act only if the net revenues derived through the 3 percent element of the rate schedule were insufficient to accomplish the return of both the power construction costs and the irrigation subsidy within the repayment period chosen by the Secretary. The application of view (*c*) would result in constantly diminishing net revenues attributable to the 3 percent element because the base upon which the 3 percent is calculated thereunder would constantly diminish. In order to return within the prescribed repayment period both power construction costs and the subsidy, the element representing "other fixed charges" would as the result of the application of that view have to be correspondingly increased. Even assuming that in some years net revenues other than those attributable to the element, if any, reflecting "other fixed charges" were in excess of 3 percent of the base (view (*d*)), the element for "other fixed charges" would still of necessity have to be increased.

These conclusions may be demonstrated by the following examples: Assume a power construction cost of $10,000 and a subsidy of $5,000 or a total of $15,000 allocated for probable return from net power revenues. Assume also a 50-year period in which that amount is to be returned. Annual net revenues equal to 3 percent of $10,000 (power investment) will return in 50 years the necessary $15,000. If, as I have concluded, the 3 percent is to be calculated on the undiminished power construction investment base, no element for "other fixed charges" is necessary in the rate schedule. However, if view (*c*) applies, the result would be as follows: In the first year there would be net revenues of $300. The "investment" upon which the 3 percent factor is calculated would be reduced to $9,700. There would be a requirement, in order to return all remaining construction costs allocated to be returned from power revenues that net revenues equaling $14,700 be returned over the remaining 49 years of the repayment period. For the second year, application of the 3 percent factor would return only 3 percent of $9,700 or $291. In order to bring the net revenues up to the point where they will equal $15,000 at the end of the 50-year period, an element for "other fixed charges" to the extent of the deficiency resulting must now be included in the rate schedule. If instead of $300 in the first year, the net revenues are $400, so that view (*d*) would operate, the base upon which the 3 percent interest element is to be calculated would, for the second year, be $9,900, rather than $9,700 (on the basis of my understanding that under view (*d*) the base would be reduced by the amount of net revenue in excess of 3 percent). The total net revenue requirement over the remaining 49 years would be $14,600. Three percent of $9,900 is $297. Assuming there were no further excess net revenues during the repayment period, net revenues at the end of the repayment period would total only $14,953. Again, a factor for "other fixed charges" would have to be included in the rate schedule in order to accomplish the return of a total of $15,000 within the prescribed 50-year period. In the absence of a more definite direction than is to be gathered from existing law, I find it impossible to accept the supposition that the Congress intended the 3 percent interest element and the discretionary authority for the inclusion of other fixed charges in the rate schedules to be manipulated in any such manner.[5]

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[5] The basis for the confusion reflected in views (*c*) and (*d*), it appears, may be attributed to the following statements appearing in a memorandum from the Bureau of Reclamation of June 15, 1944:

"(4) The interest return on the power investment is determined by a financial study of operations during the repayment period. Gross revenues, expenses and net revenues are calculated, and the net revenues applied against repayment. *Interest is calculated on the unpaid investment each year.* The rate is taken as 3 percent per annum, this being in accordance with the minimum rate provided by section 9 of the Reclamation Project Act of 1939 (53 Stat. 1187). [Emphasis supplied.]

* * * * * * *

"(5) In the past, in cases where power revenues have been required both to amortize the power investment with 3 percent and to retire a portion of the irrigation investment, it was the practice to use a sinking-fund method for determining the annual repayments of the power investment. Under this method, the annual installment to cover retirement of the power investment and interest was determined in advance by a formula. All actual revenues in excess of this installment of principal and interest were applied to the irrigation costs. It is our conclusion, however, that this method for calculating return is more stringent than required by the Reclamation Project Act of 1939. Studies now being made, such as on the Columbia Basin project, are proceeding on the premise that all net power revenues will be applied first to the power investment. *Under such a plan, the interest on the power investment is determined each year on the basis of the then remaining balance of the power investment.* Under this plan, the irrigation costs to be repaid from power revenues would be paid only after the power revenues had retired the power investment, with interest.

"In no case has the Bureau used the straight-line method of repayment with respect to construction costs to be repaid out of power revenues." [Emphasis supplied.]

The foregoing statements were based upon a contention, found in my former opinion to be without merit, that an element representing interest as a "profit" to be realized by the United States must be included in the rate schedules established under subsection 9 (c) of the 1939 act, in addition to elements representing operation and maintenance costs, amortization of the power investment, and repayment of the irrigation subsidy. Nothing is to be gained, therefore, from their use in argument.

Finally, I think it should be recognized that the basic reason for including specifically a minimum interest requirement in the rate schedules to be established under subsection 9 (c) of the 1939 act was the evident sensitivity of the Congress to the competitive position of the Government in the power field.[6] The second paragraph on page 14 of my first opinion stated this conviction as follows:

"* * * It does no violence to common sense to assume that the 3 percent interest requirement in subsection 9 (c) was intended to insure minimum rates for power in cases where a 40-year amortization plan would otherwise make possible rates which would return revenues less than an amount equal to 3 percent on the power construction costs. *It is to be remembered that the Congress has been sensitive to the competitive position of Government power projects, and it is not unreasonable to assume an intention only to insure power rates which, under no circumstances, could be less than those which would return, in addition to operation and maintenance costs, an amount equal to 3 percent of the construction investment.* In other words, the Congress may well have been concerned at this point with a minimum rate schedule rather than an enterprise which would insure a net profit to the Government. The device of requiring an interest component in the rate schedule was one method of attaining this objective." [Emphasis supplied.]

I think that to attempt to inject into the provisions of the 1939 act any suggestion that the Congress intended that the interest element of the rate schedules should be computed on less than the full amount of the power investment so long as power is sold would be to do violence not only to the language of the act but also to the obvious policy and intention of the Congress.

In summary, therefore, it is my opinion that the questions submitted to you on May 28, must be answered as follows:

1 (*a*). There is no specific statutory requirement with respect to the period of time within which power-construction costs are to be repaid. There accordingly may be established a period of time based upon what is generally regarded in similar undertakings as a reasonable repayment period, within the useful life of the project, taking into consideration the circumstances of each individual project.

1 (*b*). The repayment period for that part of the estimated costs properly chargeable to irrigation but beyond the ability of the water users to repay (the irrigation subsidy) may be established in the same manner as that established for the repayment of power construction costs.

2. The estimated power-construction investment constituting the base upon which the 3-percent interest element in the rate schedule is calculated is not subject to diminution in any manner by reason of any revenues being applied, under the Hayden-O'Mahoney amendment, against that construction investment.

Respectfully,

FOWLER HARPER, *Solicitor.*

Approved: September 10, 1945.

HAROLD L. ICKES,
Secretary of the Interior.

Senator ELLENDER. Why would it not be feasible to increase your rates to pay that out in 50 years instead of letting all this cheap power go as cheaply as it does?

Mr. RAVER. We have not come to the point yet where any of this 1,000,000-acre irrigation investment has to be repaid. We are not actually making a repayment on that, at all as yet, because it has not as yet come into production. We are looking at an estimate, Senator, of what it is going to cost and saying that on the basis of that estimate it does not look like our 50-year repayment is going to work.

[6] While extensive discussion of the matter appears to have taken place in the Department, the only recorded statement which has come to my attention is a memorandum addressed to the Secretary on June 24, 1939, by my predecessor, Solicitor Margold. After stating the language of the sentence as it then appeared with respect to the interest element the Solicitor stated that his attention had been called to the fact that—

"* * * the 3½ percent minimum probably will be too high in view of contemplated reductions in the interest charges on public works financing. I understand that the 3½ percent figure was originally fixed by analogy to the rates established for Bonneville power. * * *

"If you concur * * * that a 3½ percent minimum interest return should not be prescribed for power sales, I believe we might appropriately recommend to the committees [of the Congress] the advisability of substituting a standard for fixing the interest return on a basis comparable to the rate charged on comparable public works projects in the place of the fixed 3½ percent. * * *"

The bill as finally enacted provided for the reduced rate of 3 percent.

When we have to actually start repaying, I think we will face that question you are talking about, but we haven't reached it yet.

Senator ELLENDER. Do you mean to say this land is not in production yet?

Mr. RAVER. That is right.

Senator HAYDEN. You have finished the dam and you have finished the pumping plant.

Senator ELLENDER. When you refer to Bonneville Power Administration, do you include Grand Coulee, too?

Mr. RAVER. We have the marketing function of the power at Grand Coulee. It is operated by the Bureau of Reclamation.

Senator ELLENDER. Are you integrated with the Bureau?

Mr. RAVER. Managementwise, we are integrated with them through the Department of the Interior. We are integrated with them physically, of course, in our operations there. We have operating agreements.

TOTAL ESTIMATED FEDERAL COST OF BONNEVILLE POWER LINES CONSTRUCTION

Senator ELLENDER. On this third sheet, I notice that the total estimated Federal cost is shown of $229,399,000. Is that solely for the erection of power lines and other facilities necessary to carry the load?

Mr. RAVER. That would be the total cost of all facilities in this program when completed.

Senator ELLENDER. That is just the Bonneville?

Mr. RAVER. That is right.

Senator ELLENDER. I say that is for transmission?

Mr. RAVER. Transmission, substations, communications.

Senator ELLENDER. Up to the moment, as I notice in column No. 6, the amount appropriated up to date is $94,638,000.

Mr. RAVER. That is right.

Senator ELLENDER. Thereby leaving about $135,000,000 more to go.

Now, over what period of time do you expect to complete that?

Mr. RAVER. I would think, Senator, that our program this year should be completed at about this rate of expenditure until this job is done.

Senator ELLENDER. It would be completed by the expenditure of what?

Mr. RAVER. About the same rate we are spending it this year.

Senator ELLENDER. Is that expenditure necessary in order to transmit the power you already have generated or does it look to the future for generation of more power?

Mr. RAVER. This is worked out on the future generation.

Senator ELLENDER. What becomes of the power you are evidently not using now, since you do not have this system completed? In other words, if you have to go 3 or 4 more years to build these power lines, how are you distributing the amount of power you now have?

Mr. RAVER. We are distributing it over the present system. We have it loaded to capacity.

Senator ELLENDER. Will you distribute more after you complete this plan that you have?

Mr. RAVER. That is right.

SOURCE OF POWER

Senator ELLENDER. Where will you get the power to do that with?

Mr. RAVER. There are three additional generators going into Grand Coulee Dam this year.

Senator ELLENDER. I thought you said Grand Coulee was separate. I am talking about the Bonneville Power Administration now.

Mr. RAVER. Well, our transmission is for the purpose of taking the power away from the dams of somebody else and Grand Coulee is a dam operated and owned by the Federal Government, with the Bureau of Reclamation as the agency, and we simply take the power away from Grand Coulee and market it over this transmission system.

We do the same thing at Bonneville for the Army Engineers. We will do the same at Hungry Horse Dam.

Senator ELLENDER. Does Grand Coulee carry on a similar project in other parts of the country? That is, to the Northwest, around Washington?

Mr. RAVER. No; we are the only marketing agency in the Northwest for the Federal Government.

Senator ELLENDER. Then you market all of Grand Coulee?

Mr. RAVER. That is right.

Senator ELLENDER. I did not understand you to say that a moment ago.

You are the marketing agent, then, for all of the power that is developed publicly in the Northwest?

Mr. RAVER. That is correct, the Federal power.

Senator HAYDEN. So it comes in from dams of the Army engineers and comes in from dams constructed by the Reclamation Service?

Mr. RAVER. That is right.

Senator ELLENDER. Is there any other section of that area that you subsidize, similar to the 1 million acres that is south of Grand Coulee?

Mr. RAVER. No; that is the only one where an arrangement has been worked out. We anticipate there will be others.

Senator ELLENDER. Is any of this water that is harnessed being used for irrigation in any other section?

Mr. RAVER. Oh, yes. There is a great deal of it in other areas of the West.

Senator ELLENDER. I am talking about public money, now, or funds.

Mr. RAVER. Yes.

Senator ELLENDER. Who is that done by? Is there any subsidy in those cases?

Mr. RAVER. Yes; I think power is paying sizable subsidies in those cases. It may be that power is sold by the Government to a private utility company at a rate which will subsidize the irrigation.

Senator ELLENDER. But it is all collected, though, out of the power sold? I refer to the subsidy.

Mr. RAVER. It would be collected by the Federal agency operating the dam in connection with an irrigation project.

AMORTIZATION OF BONNEVILLE DAM, OREG.

Senator ELLENDER. Over what period of time do you amortize, let us say, all the facilities of Grand Coulee, or Bonneville? Have you a date set when the entire project will have been repaid to the Government?

Mr. RAVER. Yes, sir.

Senator ELLENDER. Can you recall it, approximately?

Mr. RAVER. For the Bonneville Dam, the repayment period I believe is 1994, when the whole thing is supposed to be paid out.

Senator CORDON. What is your surplus properly creditable to Bonneville Dam over and above the amortized charge as of today? How much more have you received, in other words, in net revenue?

Mr. RAVER. May I put this in the record [indicating]? It may be of interest to all of you. It has all the details. Taking Bonneville as an example, the total construction costs of that dam are $86,047,089; $27,023,275 of that total is not repayable. It is for navigation. In other words, it is taken out as a direct Government subsidy for navigation purposes. We pay no interest on it.

Senator ELLENDER. That is a navigation dam?

Mr. RAVER. Yes.

Senator ELLENDER. Is there navigation there now?

Mr. RAVER. Oh, yes.

Senator ELLENDER. How much? How far up does it go?

Mr. RAVER. They go all the way to Pasco although it is only with barges, however, because there are quite a few rapids.

Senator ELLENDER. That is below the dam?

Mr. RAVER. No. Below the dam they have a 27-foot channel to Portland and a 35-foot channel from Portland to the sea.

Senator CORDON. Pasco is how many miles above Bonneville Dam? Point the two out.

Mr. RAVER. Pasco is on the junction here of the Snake River, with the Columbia River at about this point here. Bonneville Dam is at about this point here [indicating].

Senator ELLENDER. So this navigation was provided to the east of the dam?

Mr. RAVER. It will be when other dams are constructed.

CHARGES ON POWER REVENUE

Senator ELLENDER. What other charge have you made, there? That leaves $59 million chargeable to power.

Mr. RAVER. That leaves $59 million chargeable to power. Receipts from power sales returned to the Treasury to June 30, 1950—to take care of the $59 million of power costs—to the general fund, $34,625,990. To the reclamation fund in payment of river regulation benefits from storage at Grand Coulee Dam which are charged to Bonneville Dam, $1,500,560.

Senator CORDON. That last one could be an operating charge, could it not?

Mr. RAVER. Yes.

Senator CORDON. It is that much more power that you could not have gotten at Bonneville if it were not for Grand Coulee so it might be called operating.

Mr. RAVER. That is, these payments covered the power expense of $20,863,718 and left a remainder of $15,262,842 applied to the repayment of capital investment for power of $59 million. Therefore, 26 percent of the power capital investment has been repaid, although only 6 years, or 12 percent of the 50-year repayment period has elapsed as of June 30. In other words, we are ahead of our repayment schedule on that dam.

We have the same schedule for Grand Coulee. The only reason I say I think we are going to have to revise this pay-out schedule with respect to land is that we have been applying it so far with respect to the power features which are interest bearing, and none of the land has come into production yet so we actually haven't started a repayment on the land features and when that time comes, I think Congress ought to take a look at this and tell us how they want us to handle it.

Senator ELLENDER. Since the Treasury is so badly in need of money at the moment, why would not it be feasible to raise those rates a little bit and retire that more quickly? Have you ever given that any thought?

Mr. RAVER. Certainly.

Senator ELLENDER. And what conclusions have you reached?

Mr. RAVER. I think it is something more than an administrative matter. If you will read the Bonneville Act, you will find the Administrator is supposed to charge rates that cover costs. It says nothing about making any profit.

Senator ELLENDER. I understand that. After you pay it all out, you can put your costs the way you want them.

Mr. RAVER. We haven't incurred these costs as yet under the law.

LIQUIDATION OF CONTRACT AUTHORITY

Senator ELLENDER. In this column 4, you have liquidation. What does that mean?

Mr. RAVER. Liquidation of our contract authority of $21 million for 1951 or $17 million for 1950.

Senator ELLENDER. What does that mean, a repayment?

Mr. RAVER. Well, we enter into contracts for purchasing materials and equipment which will take longer than 1 year to build and is delivered to us the second year and then the second year we have to have the cash to pay the contract commitment we made the year before.

Senator ELLENDER. Is that done on a contract authority?

Mr. RAVER. It is done under contract authority.

Would you like to have this repayment report put in the record?

Senator CORDON. Put it in the record.

Mr. RAVER. I think it covers all the questions you are asking in a much better way than I can do it extemporaneously.

(The documents referred to are as follows:)

BONNEVILLE DAM PROJECT—REPORT ON REPAYMENT OF CAPITAL INVESTMENT AND OPERATING EXPENSES AS OF JUNE 30, 1950

(Prepared by the Bonneville Power Administration, Portland, Oreg.)

SUPPLEMENTAL PAY-OUT REPORT NO. 5, AS OF JUNE 30, 1950

FOREWORD AND SUMMARY

The Bonneville Dam project, located on the Columbia River approximately 40 miles east of the city of Portland, Oreg., was constructed and is operated by the Corps of Engineers, Department of the Army. The project was authorized by the River and Harbor Act of 1935 (49 Stat. 1028, 1038) and the Bonneville Project Act of August 30, 1937 (50 Stat. 731), for the purpose of improving navigation on the Columbia River and for other purposes incidental thereto.

The power plant has 10 main generator units, with a combined nameplate rating of 518,400 kilowatts and a station service unit of 4,000 kilowatts. The

main generators, although having a combined nameplate rating of 518,400 kilowatts, are capable of continuous operation at 564,000 kilowatts. These capabilities require stream flow considerably in excess of the minimum flows of record. On the basis of the most critical water year of record (1936–37) and presently existing upstream storage (the Franklin D. Roosevelt, Flathead, Kootenay, and Coeur d'Alene Lakes) the nominal prime capability[1] of the project under normal operation is approximately 370,000 kilowatts. When additional upstream storage becomes available from Hungry Horse Dam and other projects, the nominal prime capability of the Bonneville Dam power plant will be increased.

The first main generator was placed in service in January 1938 and the tenth and last main generator was placed in service in December 1943 (fiscal year 1944). The Bonneville Project Act provides that energy generated by the project in excess of its requirements shall be transmitted and sold by the Bonneville Power Administration. From the commencement of operations to June 30, 1950, the project generated and delivered to the Administration's transmission system a total of 30.5 billion kilowatt-hours. During the last 4 years of this period such generation averaged approximately 3.8 billion kilowatt-hours.

Inasmuch as the power installation was completed in fiscal year 1944, the Federal Power Commission fixed the repayment period at 50 years, extending from fiscal year 1945 to fiscal year 1994, inclusive. The Corps of Engineers, represented by the Portland, Oreg., district engineer, and the Bonneville Power Administration executed a Memorandum of understanding as of November 28, 1945, governing the plan of operation and repayment of the project.

This report presents, as of June 30, 1950, the status of repayment of the capital investment and operating expenses of the Bonneville Dam project and a schedule of future investment and expenses and their repayment. The actual investment and expenses incurred to June 30, 1950, were:

	Total	Allocation	
		Nonpower	Power
Construction costs	$86,047,089	$27,023,275	$59,023,814
Replacements (net retirements)	349,671	170,727	178,944
Total costs of fixed plant	86,396,760	27,194,002	59,202,758
Net other assets	160,783	68,117	92,666
Total capital investment	86,557,543	27,262,119	59,295,424
Operation and maintenance expense	7,903,045	2,382,142	5,520,903
River regulation payments	1,500,560		1,500,560
Interest expense	21,241,545	7,399,290	13,842,255
Total expense	30,645,150	9,781,432	20,863,718

The expenses listed above include all items except depreciation expense and have been taken from the annual reports by the Administration's independent auditors, a nationally known firm of certified public accountants. The amounts are taken from the accounts kept in accordance with the Federal Power Commission's uniform system of accounts for public utilities and licensees. Depreciation expense is excluded, inasmuch as it is a noncash item representing the recovery of the capital investment in fixed plant and for the purposes of this pay-out report the amortization of the capital investment during the 50-year repayment period is controlling in lieu of depreciation expense computed in accordance with generally accepted accounting practice. Total depreciation expense for the period ending with June 30, 1950, was $6,240,101, of which $4,822,306 was allocated to power and $1,417,795 to nonpower.

The foregoing tabulation indicates that of the total capital investment, as of June 30, 1950, 69 percent was allocated to power and the remainder to nonpower. The allocation of costs was made by the Federal Power Commission by order dated June 26, 1945. The Commission allocated the total cost of powerhouse and power equipment to power, the total cost of navigation locks to nonpower,

[1] The nominal prime power of any project stated in average kilowatts is the result obtained by dividing the kilowatt-hours which would be generated at the project during the draw-down period of a critical year by the number of hours in the period. While this provides a convenient measure of the power contributed to the system by a project, it is not controlling in a determination of relative benefits at different projects because the percentage of the kilowatt-hours generated from water provided by upstream storage may differ widely at different projects.

and divided the total cost of joint facilities (dam, reservoir, fishways, etc.) equally between power and nonpower. Annual expenses for operation, maintenance, depreciation, and interest are allocated in the same manner.

Although the basic power facilities and navigation works are installed, the Portland district engineer estimates that a small amount of construction work remains to complete the project. For the purposes of this report, the district engineer has estimated that future plant additions, exclusive of interest during construction, will be $1,498,772, of which $902,038 are allocable to power. Including estimated interest during construction, the allocation to power totals $913,313. This total of additional power investment is included in the pay-out schedules presented in this report.

Cash receipts from power sales returned to the Treasury to June 30, 1950 on account of the power costs at project were:

To general fund	$34, 626, 000
To reclamation fund in payment of river regulation benefits from storage at Grand Coulee Dam	1, 500, 560
Total	36, 126, 560

These repayments covered the power expenses of $20,863,718 shown above and left a remainder of $15,262,842 applied toward repayment of power capital investment of $59,295,424. Hence, 26 percent of power capital investment was repaid, although only 6 years, or 12 percent, of the 50-year repayment period had elapsed as of June 30, 1950.

The nonpower costs are not specifically reimbursable and are thus met from general Federal revenues. In addition to the $9,781,432 of nonpower expenses shown above, nonpower depreciation expense for the period was $1,417,795. The latter represents the amount of nonpower capital investment recovered during the period from general Federal revenues.

This report includes two pay-out schedules for the project. Schedule B–2A is the theoretical pay-out schedule designed to show the minimum annual payments required to repay the power capital investment together with expenses for operation, maintenance, and interest during the 50-year repayment period. Schedule B–2, which is the actual pay-out schedule, is a summary of actual results to June 30, 1950, together with a forecast for the future. The Bonneville Power Administration estimates that revenues from power sales at its present level of wholesale rates will be adequate to meet required future payments, and that, in fact, additional payments in excess of minimum requirements may be made in the current fiscal year and in one or more of the following fiscal years, although these additional extra payments are not incorporated in the pay-out schedule included in this report. Although the repayment period ends with fiscal year 1994, scheduleB–2 has been extended through fiscal year 2017 to be comparable with the minimum repayment period for the Columbia Basin project, on which a separate pay-out report has been prepared.

Inasmuch as the actual repayment to date has been substantially in excess of minimum requirements, schedule B–2 shows that the power investment will be repaid in 1984, or 10 years ahead of the scheduled date of 1994, if the regularly scheduled payments are continued. Repayments of cash receipts to the Treasury for the account of the project in excess of minimum requirements to June 30, 1950, were $6,561,694. The extra payments resulted in total savings of $269,415 compared to the amount of interest expense that would have been incurred had only the minimum payments been made. The extra payments and interest savings thus total $6,831,109, the amount by which the actual repayment of $15,262,482 of the power capital investment exceeded the required repayment of $8,431,733 as of June 30, 1950. Each of the last two figures include repayment of the actual replacements (net retirements) of $178,944.

Although the data shown in this report for the operating period through June 30, 1950, have been taken or derived from the financial statements in the annual reports by the Administration's independent auditors, the auditors had no part in or responsibility for the preparation of this report or the schedules or exhibits which it contains, all of which have been prepared by the Bonneville Power Administration based upon such actual data and upon estimates of future construction costs and annual expenses for operation and maintenance submitted by the Portland district engineer of the Corps of Engineers, Department of the Army.

SCHEDULE B–2 AS OF JUNE 30, 1950

REPAYMENT OF FEDERAL INVESTMENT IN OPERATING EXPENSES, INTEREST AND CONSTRUCTION COSTS ALLOCATED TO COMMERCIAL POWER IN ACCORDANCE WITH THE REQUIREMENTS OF THE BONNEVILLE PROJECT ACT

Following are two payout schedules on the Bonneville Dam project. Schedule B–2a is the theoretical pay-out schedule and is, in effect, a "control" schedule since it is designed to show the minimum yearly payments required to pay off the investment in facilities at the Bonneville Dam project allocated to power in 50 years, or by the end of fiscal year 1994.

Schedule B–2, the regular pay-out schedule for the Bonneville Dam project, is a summary of actual results to June 30, 1950, together with a projection of estimated costs and repayments throughout the repayment period similar to that in the original pay-out report and in Supplements No. 1 through No. 4, inclusive. The initial investment allocated to power and the related replacements have been scheduled to be repaid in the 50-year period ending with 1994. Thereafter, the repayment obligation consists solely of current costs for plant replacement and expenses.

Although the established repayment period is 50 years, ending with fiscal year 1994, the fact that payments have been made in advance of schedule (i. e., in excess of theoretical requirements) will result in completion of the payout in only 40 years if the regular annual payments scheduled for the future are continued. As of June 30, 1950, the actual payment on account of the project, exclusive of payments to the reclamation fund for river regulation benefits, were $6,561,694 more than the scheduled requirements. This result is obtained by subtracting repayment requirements to June 30, 1950, in the amount of $28,064,306 as shown in column (9) of schedule B–2a from actual repayments of $34,626,000 shown in column (11) of schedule B–2.

The advance payment of $6,561,694 together with the resulting interest saving to June 30, 1950, in the amount of $269,415 [2] make a total of $6,831,109 which is the amount by which the amortization of the investment is ahead of schedule as of June 30, 1950. This advance payment results in pay-out in the fiscal year 1984, which is 10 years ahead of the scheduled pay-out date of 1994. These advance payments, the subsequent interest savings as a result thereof, and the continuation of the regularly scheduled payments are the factors that effect the completion of the repayment 10 years ahead of schedule and create a surplus or overpayment of $17,696,400 at the end of the regular pay-out period ending with the fiscal year 1994. This surplus is indicated in schedule B–2 which may be summarized as follows:

SUMMARY OF SCHEDULE B–2 AS OF JUNE 30, 1950

Detail of increase in gross Federal investment allocated to power:	
Expenses of operating and maintaining the Bonneville Dam project allocated to power, column (4)	$68,839,873
Interest on Federal investment allocated to power, column (5)	[1] 33,717,214
Net additions to electric utility plant, column (6)	59,937,127
Replacement investment in electric utility plant, column (7)	48,159,662
Total costs for the period allocated to power, column (9)	210,653,876
Amount required to be paid to the reclamation fund on account of river regulation benefits, column (3)	9,378,500
Total requirements	220,032,376
Amount returned to Treasury in repayment of Federal investment allocated to power:	
Repayment to general fund of the Treasury, column (11)	228,350,276
Amount paid directly to reclamation fund by Bonneville Power Administration on account of river regulation benefits	9,378,500
Total repayments per schedule B–2	237,728,776
Repayments in excess of requirements	17,696,400

[1] This is the amount of interest charged or to be charged annually to expense. In addition, interest during construction capitalized as part of construction costs, amounting to $2,336,976 ($2,325,701 actual as of June 30, 1950, and $11,275 estimated future additions) is repaid by amortization of construction costs allocated to power, column (6).

[2] Schedule B–2a, column (3) shows interest expense of $14,111,670. Actual interest expense per column 5) of schedule B–2 was $13,842,255, a saving of $269,415 due to repayments in excess of requirements.

Column 1—fiscal year

Results through June 30, 1945, are shown in lump sums designated "1945 and prior." These are actual figures derived from the auditors' report for 1945. Actual data are shown for fiscal years 1946 through 1950 as derived from financial statements in the auditors' reports for those years. Estimates for the remainder of the repayment period are presented for each fiscal year of the period. Totals for the entire period appear at the bottom of the schedule and are summarized above.

Columns 2, 3, 4, 5, 6, 7, 8, 9, and 10—detail of increases in Federal investmen allocated to power

These columns present the calculations of the gross amount that the Federal Government makes available each year for the project's power operations. All funds for operating expenses, interest, plant additions, and replacements are made available by the Treasury,[3] except for the relatively small amount arising from other sources as shown in column (8). All revenue receipts must be returned to the Treasury and are not available for those purposes. Consequently the schedule shows the details of the gross amount made available by the Government and the gross amounts returned to the Treasury in repayment of such Federal investment.

Total operating expenses other than depreciation are shown in column (2). The amounts paid directly to the reclamation fund for river regulation benefits obtained by the Bonneville Dam from Grand Coulee Dam storage are deducted in column (3) to obtain the expenses of operating and maintaining the power portion of the Bonneville Dam project. The amounts required for the payment of river regulation benefits are not shown on the theoretical pay-out schedule B–2a as these are excluded from the repayment requirements to the general fund of the Treasury. The estimate of future operation and maintenance expenses has been prepared by the Corps of Engineers, operators of the project. The expense of operating and maintaining the Bonneville Dam project shows a decrease in the year 1950 of $94,073. Operating expenses for the fiscal year 1950 increased $4,649 over fiscal year 1949. Maintenance expenses decreased $98,722 for the same period.

Interest expense on the investment allocated to power is shown in column (5). Interest expense decreased $216,808 for the year 1950 over year 1949. Part of this decrease is due to an adjustment made in the year 1949 and part is due to the decrease in the net Federal investment remaining to be paid. The estimates are computed from data in the schedule. The estimate for a given year represents 2.5 percent interest on the net unpaid investment at the beginning of the year as shown in column (13) plus 2.5 percent on one-half of the amounts shown in columns (4) and (8) for the given year.

Net additions to electric utility plant shown in column (6) are computed from the balance sheets in the auditors' reports by subtracting the total electric utility plant accounts as of the end of each year from the amount at the end of the next year in order to get the net change for the year. The net increase in electric utility plant shown in column (6) of $196,956 for the year 1950 is made up of $47,126 additions to specific power facilities and $149,830 additions to joint facilities allocated to power. The iestimated additions in the year 1951 are made up of $333,734 of specific power facilities and in the joint facilities, dam and reservoir $56,228, fishways $18,660 and buildings and grounds $46,934. For the year 1952 the estimated additions are made up of $142,180 of specific power facilities and in the joint facilities, dam and reservoir, $134,433; fishways, $144,453; and buildings and grounds, $36,691. Construction in 1952 is estimated practically to complete the project. Interest during construction is included at 2.5 percent of one-half of each year's estimated additions. One-half of the year's additions is taken as the measure of average additions for the year.

The requirements for replacements are given in column (7). Estimates for the future are based upon a detailed analysis of estimated service lives for various units of equipment. The estimates of future replacements were increased in the 1949 pay-out report by 70 percent over the figures used in prior pay-out reports.

[3] Interest is not paid by the project, but a cost for interest is imputed inasmuch as the Treasury is assumed to have raised the required funds by bond financing.

This increase was worked out in cooperation with the office of the district engineer, Corps of Engineers, and it is believed that it makes adequate provision for future costs on the basis of information available at this time. The schedule contemplates that all replacements made during the 50-year repayment period ending with 1994 will be repaid within that period even though the investment may be made within the closing years of that period, and the plant replaced may have a useful service life extending many years beyond the repayment period.

Replacement investment for 1950 and prior years is the net cost of retirements. The over-all results achieved by columns (6) and (7) insofar as actual costs are concerned are that all electric-plant costs, including costs of retirements, costs of replacements, and credits for salvage, are incorporated in the schedule. The actual replacement investment is determined as follows:

> Each year's increase in the reserve for depreciation is deducted from that year's charges to depreciation expense. The resulting difference represents the net retirements which are taken as the measure of the replacement investment. The data for this computation for past periods are obtained from the statements in the auditor's reports.[4]

The figures are:

	Fiscal year 1950	Total to June 30, 1950
Charges to depreciation expense	$601,688	$4,822,306
Less increase in reserve for depreciation	596,575	4,643,362
Replacement investment, column (7)	5,113	178,944

The principal accounts, namely, Operation and maintenance expense, Interest expense, the Electric plant account and replacements are covered separately in columns (4), (5), (6), and (7). The amounts recorded in these accounts constitute the major use of funds required for this project. However, miscellaneous accounts also include both use and sources of funds. A summarization for fiscal year 1950 of the sources and uses of funds and the net change in other accounts as set forth in column (8) is shown in table 1. A similar analysis for the period to June 30, 1950, is given in table 2. It is impracticable to estimate the amounts of the net change in other accounts from year to year and, therefore, the amount shown for the next succeeding year brings the total of these debit and credit accounts into balance.

Column (9) indicates the increase in the gross Federal investment. It is the summation of the preceding detail columns. The figure is readily checked against the balance sheets in the auditors' reports by computing the change in that item from year to year. A cumulative amount, which is the sum shown in the financial statements, is given in column (10).

Columns 11, 12, 13, 14, and 15—Amount returned to Treasury in repayment of Federal investment allocated to power

Columns (11) to (15), inclusive, indicate the amounts returned or to be returned to the Treasury in repayment of the expenses and costs of the project allocated to power. Annual repayments to the general fund are shown in column (11) with the cumulative total appearing in column (12). This cumulative repayment is deducted from the cumulative gross investment in column (10) to arrive at the remainder to be repaid as set forth in column (13).

In order to present the total returns on account of the project, the amount returned to the reclamation fund as shown in column (3) and the amount returned to the general fund as shown in column (11) are totalized annually in column (14) and on a cumulative basis in column (15).

[4] See appendix I of supplement No. 1, Report on Repayment of Operating Expense and Construction Costs of Bonneville Power Administration, Bonneville Dam Project and Columbia Basin Project, for a complete statement on the procedure for replacement investment.

TABLE 1.—*Statement of application of funds and net change in other accounts per column (8) of schedule B–2 for the fiscal year 1950*

	All accounts	"Other accounts"
Source of funds:		
Increase in gross Federal investment	$2,185,654	
Revenues from power sales allocated to Bonneville Dam project	5,605,570	$5,605,570
Total source	7,791,224	5,605,570
Uses of funds:		
Net additions to electric utility plant	196,956	
Replacement investment in electric utility plant	5,113	
Increase in deferred charges	1,111	1,111
Increase in current assets	67,504	67,504
Operation and maintenance expenses	747,693	
Interest expense	1,167,277	
Returned to general fund of the Treasury in repayment of Federal investment	5,418,000	5,418,000
Returned to reclamation fund on account of river regulation benefits from Columbia Basin project	187,570	187,570
Total uses	7,791,224	5,674,185
Less other accounts sources		5,605,570
Net change in other accounts, column (8), schedule B–2		68,615

TABLE 2.—*Statement of application of funds and net change in other accounts per column (8) of schedule B–2, cumulative to June 30, 1950*

	All accounts	"Other accounts"
Sources of funds:		
Investment of Federal Government (appropriations, etc.)	$78,658,581	
Revenues from power sales allocated to Bonneville Dam project	36,126,560	$36,126,560
Current liabilities	7,355	7,355
Total sources	114,792,496	36,133,915
Uses of funds:		
Investment in electric utility plant	59,023,814	
Replacement investment in electric utility plant	178,944	
Current assets	68,008	68,008
Investment in deferred charges	32,012	32,012
Maintenance and operation expense	5,520,903	
Interest expense	13,842,255	
Returned to general fund of the Treasury in repayment of Federal investment	34,626,000	34,626,000
Returned to reclamation fund on account of river regulation benefits from Columbia Basin account	1,500,560	1,500,560
Total uses	114,792,496	36,226,580
Less other account sources		36,133,915
Net change in other accounts, column (8), schedule B–2		92,665

Schedule B-2A
as of 6-30-50

BONNEVILLE DAM PROJECT

THEORETICAL PAYOUT SCHEDULE

REPAYMENT OF FEDERAL INVESTMENT IN OPERATING EXPENSES, INTEREST AND CONSTRUCTION COSTS ALLOCATED TO COMMERCIAL POWER IN ACCORDANCE WITH THE REQUIREMENTS OF THE BONNEVILLE PROJECT ACT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		DETAIL OF INCREASES IN GROSS FEDERAL INVESTMENT ALLOCATED TO POWER						Detail of Repayment and Unpaid Balance			
						Initial Federal Investment and Annual Gross Increases		Repayment Requirements 50-Year Payout Basis		Net Federal Investment Remaining	
Fiscal Year	Expenses of Operating and Maintaining the Bonneville Dam Project Allocated to Power Excluding Depreciation	Theoretical Interest on Federal Investment Allocated to Power	Net Additions to Electric Utility Plant	Replacement Investment in Electric Utility Plant	Net Change In Other Accounts	Annual Amount (2+3+4+5+6)	Cumulative Amount	Annual Amount	Cumulative Amount	To Be Paid (8-10)	Fiscal Year
1945 & Prior	$ 2,121,006	$ 7,395,830	$57,690,099	$ 152,972	$258,423*	$ 67,101,484	$ 67,101,484	$ 12,266,926	$ 12,266,926	$54,834,558	1945 & Prior
1946	633,755	1,378,123	258,895	4,579	53,022*	2,222,330	69,323,814	2,954,656	15,221,582	54,102,232	1946
1947	748,504	1,361,957	188,939	7,779	3,625	2,310,804	71,634,618	3,078,228	18,299,810	53,334,808	1947
1948	428,179	1,342,736	160,734	0	321,058	2,252,707	73,887,325	2,988,972	21,288,782	52,598,543	1948
1949	841,766	1,325,621	528,191	8,501	10,812	2,714,891	76,602,216	3,425,475	24,714,257	51,887,959	1949
1950	747,693	1,307,403	196,956	5,113	68,615	2,325,780	78,927,996	3,350,049	28,064,306	50,863,690	1950
Total	$ 5,520,903	$14,111,670	$59,023,814	$ 178,944	$ 92,665	$ 78,927,996		$ 28,064,306			Total
1951	922,620	1,281,967	455,556	79,917	92,665*	2,647,395	81,575,391	3,537,215	31,601,521	49,973,870	1951
1952	971,350	1,261,489	457,757	79,917	0	2,770,513	84,345,904	3,600,378	35,201,899	49,144,005	1952
1953	945,000	1,240,413	0	79,917		2,265,330	86,611,234	3,591,427	38,793,326	47,817,908	1953
1954		1,207,260		79,917		2,232,177	88,843,411		42,384,753	46,458,658	1954
1955		1,173,279		79,917		2,198,196	91,041,607		45,976,180	45,065,427	1955
1956		1,138,448		102,823		2,186,271	93,227,878		49,567,607	43,660,271	1956
1957		1,103,319		102,823		2,151,142	95,379,020		53,159,034	42,219,986	1957
1958		1,067,312		102,823		2,115,135	97,494,155		56,750,461	40,743,694	1958
1959		1,030,405		102,823		2,078,228	99,572,383		60,341,888	39,230,495	1959
1960		992,575		102,823		2,040,398	101,612,781		63,933,315	37,679,466	1960
1961		953,799		235,708		2,134,507	103,747,288		67,524,742	36,222,546	1961
1962		917,376		235,708		2,098,084	105,845,372		71,116,169	34,729,203	1962
1963		880,043		235,708		2,060,751	107,906,123		74,707,596	33,198,527	1963
1964		841,776		1,956,770		3,743,546	111,649,669		78,299,023	33,350,646	1964
1965		845,579		1,956,770		3,747,349	115,397,018		81,890,450	33,506,568	1965
1966		849,477		1,863,780		3,658,257	119,055,275		85,481,877	33,573,398	1966
1967		851,147		1,863,780		3,659,927	122,715,202		89,073,304	33,641,898	1967
1968		852,860		1,863,780		3,661,640	126,376,842		92,664,731	33,712,111	1968
1969		854,615		142,718		1,942,333	128,319,175		96,256,158	32,063,017	1969
1970		813,388		142,718		1,901,106	130,220,281		99,847,585	30,372,696	1970
1971		771,130		829,634		2,545,764	132,766,045		103,439,012	29,327,033	1971
1972		744,988		829,634		2,519,622	135,285,667		107,030,439	28,255,228	1972
1973		718,193		829,634		2,492,827	137,778,494		110,621,866	27,156,628	1973
1974		690,728		829,634		2,465,362	140,243,856		114,213,293	26,030,563	1974
1975		662,577		829,634		2,437,211	142,681,067		117,804,720	24,876,347	1975
1976		633,721		1,636,801		3,215,522	145,896,589		121,396,147	24,500,442	1976
1977		624,324		1,636,801		3,206,125	149,102,714		124,987,574	24,115,140	1977
1978		614,691		1,636,801		3,196,492	152,299,206		128,579,001	23,720,205	1978
1979		604,818		1,636,801		3,186,619	155,485,825		132,170,428	23,315,397	1979
1980		594,697		1,636,801		3,176,498	158,662,323		135,761,855	22,900,468	1980
1981		584,324		86,947		1,616,271	160,278,594		139,353,282	20,925,312	1981
1982		534,945		86,947		1,566,892	161,845,486		142,944,709	18,900,777	1982
1983		484,332		86,947		1,516,279	163,361,765		146,536,136	16,825,629	1983
1984		432,453		86,947		1,464,400	164,826,165		150,127,563	14,698,602	1984
1985		379,278		86,947		1,411,225	166,237,390		153,718,990	12,518,400	1985
1986		324,773		851,467		2,121,240	168,358,630		157,310,417	11,048,213	1986
1987		288,018		851,467		2,084,485	170,443,115		160,901,844	9,541,271	1987
1988		250,344		851,467		2,046,811	172,489,926		164,493,271	7,996,655	1988
1989		211,729		851,467		2,008,196	174,498,122		168,084,698	6,413,424	1989
1990		172,148		851,467		1,968,615	176,466,737		171,676,125	4,790,612	1990
1991		131,578		0		1,076,578	177,543,315		175,267,552	2,275,763	1991
1992		68,707		1,815,656		2,829,363	180,372,678		178,858,979	1,513,699	1992
1993		49,655		1,815,656		2,810,311	183,182,989		182,450,406	732,583	1993
1994	945,000	30,099		1,883,745		2,858,844	186,041,833	3,591,427	186,041,833	0	1994
Total	$47,104,873	$44,870,447	$59,937,127	$34,129,386	0	$186,041,833		$186,041,833			Total

*Denotes red figures.

BONNEVILLE DAM PROJECT

Schedule B-2
as of 6-30-50

REPAYMENT OF FEDERAL INVESTMENT IN OPERATING EXPENSES, INTEREST AND CONSTRUCTION COSTS ALLOCATED TO COMMERCIAL POWER
IN ACCORDANCE WITH THE REQUIREMENTS OF THE BONNEVILLE PROJECT ACT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	DETAIL OF INCREASE IN GROSS FEDERAL INVESTMENT ALLOCATED TO POWER									AMOUNT RETURNED TO TREASURY IN REPAYMENT OF FEDERAL INVESTMENT ALLOCATED TO POWER					
	Operating Expenses Exclusive of Depreciation							Initial Federal Investment and Annual Gross Increases		Repayments to the General Fund of the Treasury		Net Federal Investment Remaining To Be Paid (10-12)	Total Repayments Allocated to Bonneville Dam Project Power Operations		
Fiscal Year	Total Allocated to Power Including Requirements on Account of River Regulation Benefits from Columbia Basin Project	Amount Paid Directly to Reclamation Fund by Bonneville Power Administration on Account of River Regulation Benefits	Expenses of Operating and Maintaining the Bonneville Dam Project Allocated to Power (2-3)	Interest on Federal Investment Allocated to Power	Net Additions to Electric Utility Plant	Replacement Investment in Electric Utility Plant	Net Change in Other Accounts	Annual Amount (4 5 6 7 8)	Cumulative Amount	Annual Amount	Cumulative Amount		Annual Amount (3 11)	Cumulative Amount	Fiscal Year
1945 & Prior	$ 2,683,716	$ 562,710	$ 2,121,006	$ 7,395,923	$57,690,099	$ 152,972	$258,423*	$ 67,101,577	$ 67,101,577	$ 12,437,290	$ 12,437,290	$54,664,287	$ 13,000,000	$ 13,000,000	1945 & Prior
1946	821,325	187,570	633,755	1,375,622	258,895	4,579	53,022*	2,219,829	69,321,406	3,012,430	15,449,720	53,871,686	3,200,000	16,200,000	1946
1947	936,074	187,570	748,504	1,291,366	188,939	7,779	3,625	2,240,213	71,561,619	3,112,430	18,562,150	52,999,469	3,300,000	19,500,000	1947
1948	615,749	187,570	428,179	1,227,982	108,734	-	321,058	2,137,953	73,699,572	5,300,000	23,862,150	49,837,422	5,487,570	24,987,570	1948
1949	1,029,336	187,570	841,766	1,384,085	528,191	8,501	10,812	2,773,355	76,472,927	5,345,850	29,208,000	47,264,927	5,533,420	30,520,990	1949
1950	935,263	187,570	747,693	1,167,277	198,956	5,113	66,615	2,185,654	78,658,581	5,418,000	34,626,000	44,032,581	5,905,570	36,125,560	1950
Total	$ 7,021,463	$1,500,560	$ 5,520,903	$13,842,255	$59,023,814	$ 178,944	$ 92,665	$ 78,658,581		$ 34,625,000			$ 36,125,560		Total
1951	1,110,190	187,570	922,620	1,111,189	455,556	79,917	92,665*	2,476,617	81,135,198	3,537,000	38,163,000	42,972,198	3,724,570	39,851,130	1951
1952	1,158,920		971,350	1,086,447	457,757	79,917	0	2,595,471	83,730,669	3,000,000	41,163,000	41,967,669	3,787,570	43,638,700	1952
1953	1,132,570		945,000	1,061,004	0	79,917		2,005,921	85,816,590	3,591,000	45,354,000	40,462,590	3,778,570	47,417,270	1953
1954				1,023,377		79,917		2,048,294	87,864,884		48,945,000	38,919,884		51,195,840	1954
1955				984,810		79,917		2,009,727	89,874,611		52,536,000	37,338,611		54,974,410	1955
1956				945,278		102,823		1,993,101	91,867,712		56,127,000	35,740,712		58,752,930	1956
1957				905,330		102,823		1,953,153	93,820,865		59,718,000	34,102,865		62,531,550	1957
1958				864,384		102,823		1,912,207	95,733,072		63,309,000	32,424,072		66,310,120	1958
1959				822,111		102,823		1,870,237	97,603,309		66,900,000	30,703,309		70,068,690	1959
1960				779,395		102,823		1,827,216	99,430,527		70,491,000	28,939,527		73,867,240	1960
1961				735,301		235,708		1,916,009	101,346,536		74,082,000	27,264,536		77,645,830	1961
1962				693,426		235,708		1,874,134	103,220,670		77,673,000	25,547,670		81,424,400	1962
1963				650,504		235,706		1,831,212	105,051,882		81,264,000	23,787,882		85,202,970	1963
1964				606,510		1,956,770		3,508,280	108,560,162		84,855,000	23,705,162		88,981,540	1964
1965				604,442		1,956,770		3,506,212	112,066,374		88,446,000	23,620,374		92,790,110	1965
1966				602,322		1,863,780		3,411,102	115,477,476		92,037,000	23,440,476		96,539,680	1966
1967				597,824		1,863,780		3,406,604	118,884,080		95,626,000	23,258,080		100,317,250	1967
1968				593,215		1,863,780		3,401,995	122,286,075		99,219,000	23,067,075		104,095,820	1968
1969				588,409		142,718		1,676,207	123,962,282		102,810,000	21,152,282		107,874,390	1969
1970				540,620		142,718		1,628,338	125,590,620		106,401,000	19,189,620		111,652,940	1970
1971				491,553		829,634		2,266,187	127,856,807		109,992,000	17,864,807		115,431,530	1971
1972				458,433		829,634		2,233,067	130,089,874		113,583,000	16,506,874		119,210,130	1972
1973				424,484		829,634		2,199,118	132,288,992		117,174,000	15,114,992		122,988,670	1973
1974				389,687		829,634		2,164,321	134,453,313		120,765,000	13,688,313		126,767,240	1974
1975				354,020		829,634		2,128,654	136,581,967		124,356,000	12,225,967		130,545,810	1975
1976				317,462		1,636,801		2,899,263	139,481,230		127,947,000	11,534,230		134,324,360	1976
1977				300,168		1,636,801		2,881,969	142,363,199		131,538,000	10,825,199		138,102,950	1977
1978				282,442		1,630,801		2,864,243	145,227,442		135,129,000	10,098,442		141,861,520	1978
1979				264,274		1,636,801		2,846,075	148,073,517		138,720,000	9,353,517		145,600,090	1979
1980				245,650		1,636,801		2,827,451	150,900,968		142,311,000	8,589,968		149,438,660	1980
1981				226,562		86,947		1,250,509	152,159,477		145,902,000	6,257,477		153,217,230	1981
1982				108,249		86,947		1,200,196	153,359,673		149,493,000	3,866,673		156,995,800	1982
1983				108,479		86,947		1,140,426	154,500,099		153,084,000	1,416,099		160,774,370	1983
1984				47,215		86,947		1,079,162	155,579,261		156,675,000	1,095,739*		164,552,940	1984
1985						86,947		1,031,947	156,611,208		160,266,000	3,654,792*		168,331,510	1985
1986						851,467		1,796,467	158,407,675		163,857,000	5,449,325*		172,110,080	1986
1987						851,467		1,796,467	160,204,142		167,448,000	7,243,858*		175,888,650	1987
1988						851,467		1,796,467	162,000,609		171,039,000	9,038,391*		179,667,220	1988
1989						851,467		1,796,467	163,797,076		174,630,000	10,832,924*		183,445,790	1989
1990						851,467		1,796,467	165,593,543		178,221,000	12,627,457*		187,224,360	1990
1991						0		945,000	166,538,543		181,812,000	15,273,457*		191,002,930	1991
1992	1,132,570	187,570				1,815,656		2,760,656	169,299,199		185,403,000	16,103,601*	3,778,570	194,781,500	1992
1993	945,000	0				1,815,656		2,760,656	172,059,855		188,994,000	16,934,145*	3,591,000	198,372,500	1993
1994						1,883,745		2,828,745	174,888,600	3,591,000	192,585,000	17,696,400*	3,591,000	201,963,500	1994
1995						1,822,988		2,767,988	177,656,588	2,747,988	195,352,988		2,767,988	204,731,488	1995
1996						2,070,784		3,015,784	180,672,372	3,015,784	198,368,772		3,015,784	207,747,272	1996
1997						255,128		1,200,128	181,872,500	1,200,128	199,568,900		1,200,128	208,947,400	1997
1998						255,128		1,200,128	183,072,628	1,200,128	200,769,028		1,200,128	210,147,528	1998
1999						255,128		1,200,128	184,272,756	1,200,128	201,969,156		1,200,128	211,347,656	1999
2000						255,128		1,200,128	185,472,884	1,200,128	203,169,284		1,200,128	212,547,784	2000
2001						136		945,136	186,418,020	945,136	204,114,420		945,136	213,492,920	2001
2002						136		945,136	187,363,156	945,136	205,059,556		945,136	214,438,056	2002
2003						136		945,136	188,308,292	945,136	206,004,692		945,136	215,383,192	2003
2004						136		945,136	189,253,428	945,136	206,949,828		945,136	216,328,328	2004
2005						136		945,136	190,198,564	945,136	207,894,964		945,136	217,273,464	2005
2006						834,542		1,779,542	191,978,106	1,779,542	209,674,506		1,779,542	219,053,006	2006
2007						834,542		1,779,542	193,757,648	1,779,542	211,454,048		1,779,542	220,832,548	2007
2008						834,542		1,779,542	195,537,190	1,779,542	213,233,590		1,779,542	222,612,090	2008
2009						834,542		1,779,542	197,316,732	1,779,542	215,013,132		1,779,542	224,391,632	2009
2010						834,542		1,779,542	199,096,274	1,779,542	216,792,674		1,779,542	226,171,174	2010
2011						312,178		1,257,178	200,353,452	1,257,178	218,049,852		1,257,178	227,428,352	2011
2012						312,178		1,257,178	201,610,630	1,257,178	219,307,030		1,257,178	228,685,530	2012
2013						312,178		1,257,178	202,867,808	1,257,178	220,564,208		1,257,178	229,942,708	2013
2014						312,178		1,257,178	204,124,986	1,257,178	221,821,386		1,257,178	231,199,886	2014
2015						312,178		1,257,178	205,382,164	1,257,178	223,078,564		1,257,178	232,457,064	2015
2016						1,690,856		2,635,856	208,018,020	2,635,856	225,714,420		2,635,856	235,092,920	2016
2017	945,000		945,000			1,690,856		2,635,856	210,653,876	2,635,856	228,350,276	17,696,400*	2,635,856	237,728,776	2017
Total	$78,218,370	$9,378,500	$68,839,873	$33,717,214	$59,937,127	$48,159,662	0	$210,653,876		$228,350,276		$17,696,400*	$237,728,776		Total

* Denotes red figures.

COLUMBIA BASIN PROJECT REPORT ON REPAYMENT OF CONSTRUCTION COSTS AND OPERATING EXPENSES AS OF JUNE 30, 1950

(Prepared by the Bonneville Power Administration, Portland 8, Oreg.)

SUPPLEMENTAL PAYOUT REPORT NO. 5 AS OF JUNE 30, 1950

FOREWORD AND SUMMARY

The Columbia Basin project, located in east-central Washington, was authorized by the River and Harbor Act of 1935 (49 Stat. 1028, 1039) and was reauthorized by the Columbia Basin Project Act (57 Stat. 14). The latter made the project subject to the Reclamation Project Act of 1939 (53 Stat. 1187). Authorized project purposes include flood control, improvement of navigation, regulation of stream flow, storage and delivery of stored water, reclamation, other beneficial uses, and generation of power as a means of financially aiding and assisting such undertakings. The payout requirements of the project are governed by the Reclamation Project Act of 1939 and the authorizing acts.

The project's principal features are Grand Coulee Dam and power plant, Franklin D. Roosevelt Lake, which extends to the Canadian border and has a useful storage capacity of 5,212,000 acre-feet, and irrigation works for the reclamation of 1,029,000 acres of arid lands lying generally south of the dam. Construction and operation are by the Bureau of Reclamation of the Department of the Interior but power in excess of the project's requirements is delivered to the Bonneville Power Administration for transmission and sale. The Bonneville Power Administration was designated marketing agent for the surplus power by Executive Order No. 8526, dated August 26, 1940, which was issued pursuant to the River and Harbor Act of 1935.

The power plant will consist ultimately of 18 main generators, each with a name-plate rating of 108,000 kilowatts, thus making a total of 1,944,000 kilowatts. However, the main generators are capable of continuous operation at 120,000 kilowatts each at full head. Fifteen of the main generator units are in operation,[1] and the remaining three are scheduled to be in service in calendar year 1951. In addition to the main generator units there are three house units of 10,000 kilowatts each, the last of which was placed in operation on January 24, 1951. One of these station service units is directly connected to the Bonneville Power Administration's transmission system for serving the commercial load. The present 15-unit power development has a nominal prime power capability[2] of approximately 1,058,000 kilowatts based on the most critical water year of record (1936–37) and presently existing upstream storage (Flathead, Kootenay, and Coeur d'Alene lakes). When additional upstream storage becomes available at Hungry Horse Dam and other projects, the prime capability of the Grand Coulee power plant will be increased.

The provisions of the Reclamation Project Act of 1939 in regard to allocation and reimbursement of costs are—

1. Construction costs may be allocated to irrigation, power, municipal water supply, flood control, navigation, and "Other miscellaneous purposes." The latter includes such purposes as industrial water supply and river regulation.

2. Construction costs are reimbursable except those allocated to flood control and navigation.

3. Reimbursable construction costs, regardless of purpose to which allocated, are reimbursable without interest.[3]

[1] Only 13 units were in operation as of June 30, 1950, but two additional units were completed and placed in service during the last half of calendar year 1950.

[2] The nominal prime power of any project stated in average kilowatts is the result obtained by dividing the kilowatt-hours which would be generated at the project during the drawdown period of a critical year by the number of hours in the period. While this provides a convenient measure of the power contributed to the system by a project, it is not controlling in a determination of relative benefits at different projects because the percentage of the kilowatt-hours generated from water provided by upstream storage may differ widely at different projects.

[3] The Solicitor of the Department construed the repayment provisions of the 1939 act as not requiring the return of interest on any part of project costs. The 3 percent interest provision of section 9 (c) of the act is a minimum rate requirement and does not demand the repayment of true interest on any portion of the construction costs. This is evidenced by the Solicitor's interpretation that minimum power rates must return 3 percent on the power allocation without reduction for actual repayment of such allocation.

4. All expenses of operation and maintenance are reimbursable. No express provision is made for allocation of such expenses to purposes except for a requirement in section 9 (c) (which deals with power rates and not with allocation or reimbursement) that power rates as a minimum shall be sufficient to return, among other things, "an appropriate share of the annual operation and maintenance cost."

The act makes no reference to replacements. In cost accounting as prescribed by the Federal Power Commission, replacements are treated as construction costs by retiring replaced items from the construction cost accounts and by adding the cost of the replacements to such accounts; but for the purpose of payout accounting for the Columbia Basin project, replacements are considered as expenses of the year in which they are made.

An allocation of construction costs was made by the Secretary of the Interior pursuant to applicable statutes. The allocation is contained in a report on the project published as House Document No. 172, Seventy-ninth Congress, first session. The costs of the specific irrigation works were obviously allocated to irrigation. The costs of the multipurpose dam, reservoir, etc., were allocated as follows: $1 million to flood control and navigation, with the remainder divided 56 percent to power, including future downstream river regulation, and 44 percent to irrigation. The 56 percent allocation was subdivided equally (i. e., 28 percent and 28 percent) to power at Grand Coulee Dam and to power at downstream power plants, existing and proposed, in view of the benefits to downstream plants in the form of increased prime power capability effected by Grand Coulee storage operations. Inasmuch as only Bonneville Dam is presently actually realizing benefits from such storage, the present allocation to commercial power consists of the Grand Coulee portion, 28 percent, plus the Bonneville Dam portion, 3.85 percent, or a total of 31.85 percent, leaving 24.15 percent allocated to future downstream river regulation. The latter is a potential allocation to commercial power. When and if additional downstream projects, such as McNary Dam now under construction, realize benefits from Grand Coulee storage, an appropriate portion of the allocation to future downstream river regulation will be reallocated to commercial power. Unless so reallocated, such costs will be returned from revenues from the sale of Grand Coulee power.

The power plant at Grand Coulee Dam is in effect a joint facility, in that it will furnish substantial amounts of power for irrigation pumping as well as for commercial sale. However, the bulk of the pumping load will be supplied during the summer months of high stream flow, and will thus be provided largely from secondary energy rather than from prime power. On the basis of anticipated relative usages and relative values of secondary energy, the costs of the power plant were allocated 7½ percent to irrigation and 92½ percent to commercial power. This allocation applies to the power plant with only 15 main generator units. All of the cost of the sixteenth, seventeenth, and eighteenth units will be allocated to commercial power.

The nominal allocation of $1 million to flood control and navigation is actually based on navigation rather than flood-control benefits. However, the project will provide substantial flood-control benefits when the Corps of Engineers' main control plan for the Columbia River Basin is completed. The reservoir of the project is an important unit in that plan and will be operated with other large projects to achieve substantial control of floods. To enable the project to operate for flood control under the plan, construction modifications estimated to cost $250,000 will be made. In view of these facts, a substantially greater allocation of costs to flood control and navigation will ultimately be justified.

The accompanying schedule 1 sets forth the present official estimate of the cost of the project when completed and the allocation of those costs in accordance with the Secretary's allocation report.

SCHEDULE 1.—*Allocation of construction costs as of June 30, 1950*

	Total [1]	Flood control and navigation [1]	Commercial power	Future river regulation	Irrigation
A. Allocation of current official estimate of construction costs:					
Dam, reservoir, etc.	$165,300,000	$1,000,000	$52,329,550	$39,678,450	$72,292,000
Power plant (15 units)	96,950,000		89,678,750		7,271,250
Irrigation works	418,524,000				418,524,000
Subtotal	680,774,000	1,000,000	142,008,300	39,678,450	498,087,250
Units 16, 17 and 18	16,350,000		16,350,000		
Total	697,124,000	1,000,000	158,358,300	39,678,450	498,087,250
B. Current estimate of subsidy:					
Total allocation to irrigation					498,087,250
Less payments by water users: $85 per acre, 1,029,000 acres					87,465,000
Total					410,622,250
Pumping power revenues (to fiscal year 2017)			$50,500,000		
Less operation and maintenance assigned to pumping power		11,389,238			
Less replacements assigned to pumping power		4,862,412	16,251,650		34,248,350
Subsidy from power if paid by fiscal year 2017					376,373,900
Less additional pumping power revenues if payout is extended to fiscal year 2044:					
Pumping power revenues (2018–2044)			23,301,000		
Less operation and maintenance (2018–2044)		4,738,500			
Less replacements (2018–2044)		2,625,696	7,364,196		15,936,804
Irrigation subsidy from commercial power revenues if period is extended to fiscal year 2044					360,437,096

[1] Exclusive of an estimated amount of $250,000 for proposed modification of outlets for flood-control purposes. This amount would be nonreimbursable.

In addition to the allocation of costs as summarized above and in schedule 1, an allocation of repayment responsibility has been made. Such an allocation is required by the fact that costs allocated to irrigation exceed the repayment ability of the water users; hence, such excess must be reimbursed from other project revenues. The allocation of repayment responsibility may be summarized as follows:

Total construction costs	[1] $680,774,000
Less nonreimbursable allocation to navigation	1,000,000
Total reimbursable construction costs	679,774,000
Less estimated payments by water users:	
For irrigation pumping power	[2] 50,500,000
For construction costs	[2] 87,465,000
	137,965,000
Less operation and maintenance ($11,389,238 [2]) and replacements ($4,862,412 [2]) on power plant allocated to irrigation pumping	16,251,650
	121,713,350
Construction costs to be returned by commercial power revenues	558,060,650
Amount to be returned by fiscal year 2017	383,745,830
Amount to be returned by extension of repayment period	174,314,820

[1] Exclusive of estimated costs of $16,350,000 for units 16, 17 and 18 and $250,000 for flood control modifications.

[2] These amounts are totals for the 75-year repayment period ending with fiscal year 2017. Reference to schedule 1 reveals that this total of $558,060,650 to be repaid from commercial power revenues consists of:

Allocation to present commercial power	$142,008,300
Allocation to future river regulation	39,678,450
Irrigation subsidy (excess of amount allocated to irrigation over repayment ability of water users)	376,373,900
	558,060,650

As shown in the lower portion of schedule 1, this total and the subsidy will be reduced by $15,936,804 of estimated additional net irrigation pumping power revenues if the repayment period is extended, as provided by the present agreement, 27 years to fiscal year 2044 to accomplish repayment of costs in excess of those covered by the 75-year repayment plan.

The Bonneville Power Administration and the Bureau of Reclamation entered into a memorandum of understanding dated January 31, 1946, governing the operation and payout of the project on the basis of a 15-unit development. At that time the last three units were not authorized. A separate report on the cost of the last three units and their allocation is contained in the report to the Secretary printed as House Document No. 64, Eighty-first Congress, first session. The parties will enter into a supplemental agreement covering the operation and payout of those three units. This payout report covers only the 15-unit project.

The essential features of the payout agreement are as follows:

1. The payout period was fixed at 75 years, fiscal year 1943 to 2017, inclusive. This period (designated as "the minimum repayment period") began with the first year after initial commercial power production and extends for 50 years after the last block of land is expected to receive irrigation water.

2. Commercial power revenues in excess of requirements for operation, maintenance and 3 percent interest on power construction costs will be devoted first to the repayment of the interest-bearing power investment. Revenues from irrigation pumping power and payments by the landowners on construction costs will be applied as received to the repayment of expenses allocated to irrigation and to the repayment of construction costs allocated to irrigation. When the power investment is repaid, excess commercial power revenues, together with net irrigation pumping power revenues and payments by the water users for construction costs, will be applied to repayment of irrigation construction costs. For the purposes of the payout report, the allocation to future river regulation is lumped with irrigation construction costs and both are to be repaid from Grand Coulee revenues without interest, except that when and as the allocation to future river regulation is reallocated to commercial power, it will be repaid with interest as a commercial power allocation.

3. The memorandum of understanding provided for the repayment of a fixed amount of construction costs, namely, $505,459,180 (together with operation and maintenance, interest and replacements) during the minimum repayment period, that is, the period ending with fiscal year 2017. This amount of construction costs represents the 1945 estimate of the costs of the dam, reservoir, power plant, etc., and the 1940 costs of the irrigation works. The agreement provides that any excess of actual costs over this figure will be repaid by extension of the repayment period beyond fiscal year 2017. Of this total of construction costs to be repaid during the minimum repayment period, commercial power revenues will repay $383,745,830, and the water users will repay $121,713,350. This latter sum represents gross payments by the water users for both pumping power and irrigation

construction costs after deducting operation and maintenance and replacements applicable to irrigation pumping operations.

4. All of the costs of operating and maintaining the multipurpose dam, reservoir, etc., are repaid from power revenues.

The memorandum provided also that the Columbia Basin project would keep cost accounts, as well as payout accounts, covering the power investment and operations in accordance with the Federal Power Commission's system of accounts. The principal differences between the two types of accounts are:

1. Interest is computed at the rate of 2½ percent per annum in the cost accounts but at 3 percent in the payout accounts. Although repayment of interest is not legally required,[4] the memorandum provides that 3 percent interest on power construction costs as well as the irrigation subsidy will be repaid from power revenues.

2. Construction costs in the cost accounts include interest during construction but the payout accounts do not include interest during construction in such costs.

3. The cost accounts include depreciation expense based on estimated service lives of the facilities, but the payout accounts provide for amortization of the construction costs.

4. Replacements are treated as construction costs (by retiring replaced or removed items from the plant accounts and adding the replacement to such accounts) in the cost accounts but as annual expenses in the payout accounts.

The actual expenses incurred to June 30, 1950 on both the cost and payout bases and assigned to power operations are summarized in schedule 2. The schedule also shows the net revenues on a cost-accounting basis, the excess of amortization on the pay-out basis over the original schedule, and the source of revenues on both accounting bases. On the cost basis, net revenues to June 30, 1950 in excess of expenses were $18,360,781. On a pay-out basis repayments of construction costs and replacements in excess of the original schedule were $13,000,303, as analyzed in detail in schedule 3. It is estimated that, on the basis of results to date and assuming a continuation of payments scheduled for the future, the power investment will be repaid by the end of fiscal year 1977, or only 35 years after commencement of commercial power generation.

The Bonneville Power Administration estimates that revenues from the sale of power at its present level of wholesale rates will be adequate to meet future payments required from commercial power revenues in accordance with the memorandum of understanding.

SCHEDULE 2.—*Columbia Basin project—expenses incurred to June 30, 1950, and allocated to present commercial power in the cost and payout accounts*

	Cost accounts	Payout accounts
Operation and maintenance	$10,540,066	[1] $12,206,578
Depreciation	5,131,583	
2½ percent interest on power investment	19,636,487	
3 percent interest on power construction costs		23,117,145
Scheduled amortization of power construction costs and replacements		[2] 5,367,101
Total expenses or payout requirements	35,308,136	40,690,824
Net revenues in excess of costs	18,360,781	
Amortization in excess of schedule		13,000,303
Total revenues or repayments (details below)	53,668,917	53,691,127
Source of total revenues or repayments:		
Commercial power revenue payments from Bonneville Power Administration	53,618,680	53,618,680
Miscellaneous electric revenues	4,682	[3]
Miscellaneous income, net	45,555	[4] 72,447
	53,668,917	53,691,127

[1] Includes $1,666,512 of expense allocated to irrigation in the cost accounts but to power for repayment purposes.

[2] Includes replacements of $414,512.

[3] The $4,682 of pumping power revenues was assigned to power in the cost accounts but to irrigation in the payout accounts.

[4] Includes $26,892 of multipurpose miscellaneous income allocated to irrigation in the cost accounts. See schedule 4.

[4] See footnote 3 re Solicitor's Opinion. Since there is no legal requirement for the payment of interest on any portion of the construction costs, any amounts collected in excess of the construction costs (and, of course, operation and maintenance costs), regardless of whether designated as interest for accounting or other purposes, are available for the return of construction costs. Hence, there is no requirement for power revenues to return interest as well as irrigation subsidy.

SCHEDULE C–2 (REVISED AS OF JUNE 30, 1950)

PAYOUT OF OPERATING EXPENSES AND CONSTRUCTION COSTS ALLOCATED TO COMMERCIAL POWER WITH 3 PERCENT INTEREST AND PAYOUT OF OPERATING EXPENSES AND CONSTRUCTION EXPENDITURES ALLOCATED TO IRRIGATION AND RIVER REGULATION

Schedule C–2, payout schedule for the Columbia Basin project, presented herewith, shows actual results to June 30, 1950, and estimated amounts of repayments and costs for the remainder of the repayment period. The payout report of June 30, 1945, gives a detailed description of the C–2 schedule issued with that report.

Totals of power and irrigation costs at the end of 2017 have remained substantially the same on the payout schedules as presented in the various supplements of payout reports. The total interest expense has increased some due to the later reports' reflecting higher construction costs for power facilities and thus increasing the interest base. The estimates of replacement costs have been rearranged somewhat but have not been increased. At the bottom of the C–2 schedule is an estimate of irrigation costs remaining to be repaid after year 2017 amounting to $174,314,820. If the yearly repayment amount for year 2017 were continued after that date, the $174,314,820 would be paid off in 27 years or by year 2044. The Bureau of Reclamation reports that this is within the estimated useful life of the irrigation facilities.

Column No. 2 of the payout schedule shows the amount of power revenues applied on account of the Columbia Basin project. Through fiscal year 1950 the actual amounts applied have been in excess of the required amounts as shown on the C–2 schedule in the June 30, 1945, payout. Following is a schedule entitled "Statement Showing Amount of Repayments to the Reclamation Fund From Commercial Power Revenues in Excess of Repayments Required by the Memorandum of Understanding" (schedule 3). This schedule shows that through the period ending June 30, 1950, the repayments from commercial power revenues have been in excess of originally scheduled requirements by the amount of $13,000,303.

The miscellaneous income shown in column No. 3 of the pay-out schedule for the years through fiscal year 1950 differs from that shown in project's revenue and expense statements in the commercial audit reports. In the audit reports the income resulting from joint facilities is partially assigned to irrigation and flood control based on the allocation of 44 percent to irrigation and 56 percent to power. For pay-out purposes all of the miscellaneous income attributable to joint facilities is assigned to power based on the fact that power stands all of the operating and maintenance expenses of the joint facilities and repayment of same. A reconciliation follows (schedule 4) of miscellaneous income shown on the audit schedules with amounts shown on pay-out schedule C–2 for the years from the start of operations through fiscal year 1950.

The actual operation and maintenance expenses for the years from start of operations through fiscal year 1950 as shown in column No. 5 differ from the amounts shown in the commercial audit reports. As mentioned previously, the operation and maintenance expenses shown on schedule C–2 include all of the operation and maintenance of the multipurpose facilities whereas the audit allocates 44 percent of the joint operation and maintenance to irrigation. The operation and maintenance on the pay-out does not include an allowance for depreciation as is shown in the audit schedules. The pay-out is reported on a different basis in that replacements are provided for as a separate item and the investment is amortized over the repayment period.

Some consideration has been given to changing the basis for reporting operation and maintenance expenses in the C–2 schedule. The memorandum of understanding between the Bureau of Reclamation and Bonneville Power Administration covering repayment provisions of the Columbia Basin project provides that specific power is to pay all of the operation and maintenance expenses of the multipurpose facilities. A method of changing the schedule would be to transfer the 44 percent of joint operation and maintenance (the irrigation allocation) to column 19 of the C–2 schedule along with the 7½ percent of specific power operation and maintenance expense that is allocated to irrigation. This would make more money available for repayment of power costs and result in some reduction in interest. The operation and maintenance expenses allocated to irrigation in this manner would eventually be repaid by power revenues but at a later date in the repayment period.

SCHEDULE 3.—*Statement showing amount of repayments to the reclamation fund from commercial power revenues in excess of repayments required by the memorandum of understanding*

Line No.	Item	1944 and prior	1945	1946	1947	1948	1949	1950	Total to June 30, 1950
1	Actual repayments from commercial power revenues	$11,339,719	$5,078,961	$6,000,000	$6,000,000	$6,200,000	$9,000,000	$10,000,000	$53,618,680
2	Actual miscellaneous income	16,425	8,565	7,325	12,973	6,873	11,990	8,296	72,447
3	Total repayments	11,356,144	5,087,526	6,007,325	6,012,973	6,206,873	9,011,990	10,008,296	53,691,127
4	Repayment requirements:								
5	Actual operation and maintenance expense	2,793,947	1,902,444	1,805,873	1,077,003	1,618,644	1,318,315	1,690,352	12,206,578
6	Actual 3 percent interest expense	5,939,719	2,478,961	2,523,364	2,637,576	2,842,334	3,176,456	3,518,735	23,117,145
7	Scheduled repayment of construction costs and replacements	2,622,478	706,121	30,315	244,061	167,542	197,172	1,399,412	5,367,101
8	Total requirements	11,356,144	5,087,526	4,359,552	3,958,640	4,628,520	4,691,943	6,608,499	40,690,824
9	Repayments from commercial power revenues in excess of originally scheduled requirements (line 3 minus line 8)	0	0	1,647,773	2,054,333	1,578,353	4,320,047	3,399,797	13,000,303
10	Total actual repayments of construction costs and replacements (line 7 plus line 9)	2,622,478	706,121	1,678,088	2,298,394	1,745,895	4,517,219	4,799,209	18,367,404

The memorandum of understanding and the accompanying pay-out schedule contemplated the repayment by the end of fiscal year 2017 of $505,459,180 of construction costs plus $72,920,000 of replacements; a total of $578,379,180. (In addition, of course, actual expenses for operation maintenance and 3 percent interest on power construction costs were repayable.) Of this total, commercial power net revenues will repay $449,859,666,[1] and irrigation pumping power net revenues will repay $127,774,524, and miscellaneous income will repay $744,990.

The total repayment, $505,459,180, of construction costs was based on the then (1945) current estimate of costs for the joint facilities and the power plant and the 1940 estimate for the irrigation works. The memorandum provides that the excess of actual costs over these estimates will be repaid by an extension of the repayment period.

[1] The original schedule showed a surplus of $3,187,372 at June 30, 2017, thus making a total of $453,047,038 from net commercial power revenues.

SCHEDULE 4.—*Reconciliation of miscellaneous income shown on the audit schedules with amounts shown on pay-out schedule C–2*

Period	Total allocated to power per audit reports	Add amounts allocated to irrigation and navigation in audit reports [1]	Deduct				June 30, 1950, data per schedule C–2
			Specific irrigation	Appropriation reimbursements	Irrigation pumping revenues	Rental grazing and farmland	
Oct. 1, 1941, to June 30, 1944	$9,198.05	$7,227.04					$16,425
Fiscal year:							
1945	4,796.57	3,768.74					8,565
1946	4,102.18	3,223.14					7,325
1947	11,323.39	14,192.85	$11,138.61	$1,404.63			12,973
1948	3,655.47	14,549.87	10,784.02	548.00			6,873
1949	7,833.69	24,670.34	18,919.64	1,080.00	$514.61		11,990
1950	4,645.85	56,800.85	7,276.82			$45,873.44	8,296
Total	45,555.20	124,432.83	48,119.09	3,032.63	514.61	45,873.44	72,447

[1] In the audit schedules the miscellaneous income attributable to multipurpose facilities is allocated 44 percent to irrigation and 56 percent to power. For payout purposes, inasmuch as power pays all of the operating expenses of the multipurpose facilities, all of the income from multipurpose facilities is credited to power.

A reconciliation of the operation and maintenance costs shown on the audit schedules with amounts shown on the payout schedule is given below.

Period	Total operating expenses allocated to power per audit reports	Add amounts allocated to irrigation		Deduct allowance for depreciation	Operation and maintenance expense per schedule C–2
		Operation	Maintenance		
Oct. 1, 1941, to June 30, 1944	$3,438,024.44	$174,171.99	$187,377.28	$1,005,626.11	$2,793,947
Fiscal year:					
1945	2,236,001.82	91,185.46	89,893.55	514,637.10	1,902,444
1946	2,173,991.78	109,012.99	70,709.42	547,840.94	1,805,873
1947	1,525,594.51	66,710.95	65,428.13	580,730.63	1,077,003
1948	2,084,808.34	107,316.59	61,741.89	635,222.68	1,618,644
1949	1,713,389.78	83,610.75	245,896.60	724,582.02	1,318,315
1950	2,499,838.34	88,563.99	224,893.81	1,122,943.79	1,690,352
Total	15,671,649.01	720,572.72	945,940.68	5,131,583.27	12,206,578

Column No. 6 shows 3 percent interest amounts computed on construction costs allocated to power. The amounts for fiscal year 1950 and prior are calculated on the average construction costs allocated to power. Similarly the estimated amounts for fiscal year 1951 and subsequent years are computed on the construction costs remaining to be repaid at the end of the previous fiscal year as shown in column 14 plus interest on one-half the current year's estimated addition as shown in column No. 12. Column No. 11 includes 100 percent of replacements of multipurpose facilities. The memorandum of understanding provides that specific power should pay for the total multipurpose replacements but there is some doubt as to whether the intent of the agreement was to include the portion allocable to irrigation in the interest base. To remove these costs from the interest base the portion allocable to irrigation could be included in column No. 20, replacements on power plant allocated to pumping power.

Replacements on dam, power plant, and appurtenant works are given in column No. 11.

The replacement procedure followed by the Columbia Basin project, although different in some respects than that followed by the Bonneville Power Administration and the Bonneville Dam project,[10] results in the inclusion of all plant costs in the pay-out schedule. The Columbia Basin project's replacement procedure is outlined briefly as follows:

A replacement may be defined as the construction or installation of plant in place of property retired. An analysis is made of construction work orders in order to determine the cost of plant units which replaced similar units, and the amount thereof is included in the replacement column in the pay-out schedule. However, if a betterment of a substantial nature resulted from the replacement, an estimate is made of the costs that would have been incurred if the replacement had been made in kind at current prices. This estimate is included in the replacement column and the difference between the estimate and the actual cost is included in the columns for construction costs. The cost of removal of plants retired, less the salvage credit for reusable material, is included in the columns for construction costs. Thus all plant costs, original construction, replacements, costs of removal, and salvage credits, are included in the construction and replacement columns of the Columbia Basin project's pay-out schedule C–2.

Construction costs as of June 30, 1950, as given in columns Nos. 9, 10, 11, 12, 23, 24, 26, and 27 are also reported on a different basis from that shown in the commercial audit report. The amounts on the pay-out report do not include interest during construction and the depreciation reserve on general plant has been deducted therefrom. Depreciation on general plant equipment is charged as a cost element to other fixed plant items as they are constructed. The offsetting credit is the depreciation reserve. Therefore a part of the cost of the dam, reservoir and appurtenant works, power plant, and irrigation works is depreciation on the general plant equipment. At June 30, 1950, the cost of installing generating units R7, R8, and R9 was $7,004,580. As these three units are not covered in the present memorandum of understanding the construction costs are not included in the C–2 schedule. Following is a schedule showing the reconciliation of construction costs and replacements as shown on the C–2 schedule (schedule 5).

The totals of construction and replacement costs for the 75-year repayment period as shown in the accompanying C–2 schedule are as follows:

Construction costs and replacements allocated to commercial power	$210, 065, 888
Replacements on power plant allocated to irrigation pumping	4, 682, 412
Construction costs allocated to irrigation and river regulation	363, 450, 880
Total of construction costs and replacements	578, 379, 180

At the end of the 75-year repayment period with the repayments as shown, there is a surplus of $316,064.

[10] See appendix I of supplement No. 1 of the report on repayment of operating expense and construction costs of Bonneville Power Administration, Bonneville Dam project, and Columbia Basin project for a comprehensive analysis of the replacement procedure followed for the Bonneville Power Administration and the Bonneville Dam project.

SCHEDULE 5.—*Reconciliation of construction costs and replacements as shown on the audit schedules with amounts shown on pay-out schedule C–2—as of June 30, 1950*

	Totals per audit schedule 13	Deductions						Add retirements and retirement work in progress	June 30, 1950, data per schedule C–2
		Interest during construction	Depreciation reserve on general service plant	USBR adjustment for land purchase program [1]	Replacements on electric and multipurpose plant	Multipurpose plant abandoned	Construction costs of units R–7, R–8, and R–9		
Construction costs of dam, reservoir, and appurtenant works allocated to commercial power (column 9)	$49,342,171.50	$3,359,775.86	$1,160,035.52		$66,527.67			$2,471.93	$44,758,304.38
Construction costs of power plant allocated to commercial power (column 10)	103,446,567.10	3,134,867.52			205,633.50		$7,004,580	245,863.18	93,347,349.26
Replacements on dam, power plant, and appurtenant works allocated to commercial power (column 11)					[2]414,511.58				414,511.58
Total construction costs and replacements allocated to commercial power (column 12)									138,520,165.22
Construction costs of dam, reservoir, and appurtenant works allocated to river regulation (column 23)	37,413,294.91	2,547,522.35	879,587.38		50,444.06			1,874.32	33,937,615.44
Amounts allocated to power (including downstream river regulation) per audit schedule 13	190,202,033.51								
Construction costs of dam, reservoir, and appurtenant works allocated to irrigation (column 24)	63,521,915.86		1,602,560.85		91,906.35	[3] $1,644.89		3,414.91	61,832,508.46
Construction costs of irrigation works (column 26)	106,182,002.38			$1,382,149.34				3,079.23	104,802,932.27
Amounts allocated to irrigation per audit schedule 13	[2]169,703,918.24								
Total construction costs allocated to irrigation and river regulation (column 27)									200,573,056.17
Total [4]	359,905,951.75	9,042,165.73	3,642,183.75	1,382,149.34	0	[3] 1,644.89	7,004,580	256,703.57	339,093,221.39

[1] This item is to be reimbursed by resale of the land and it has not therefore been included in the pay-out schedule.
[2] Denotes red figures.
[3] The allocation to navigation of $1,000,000 must be added to this figure to check to the total allocation to other than power in the audit schedule.
[4] Excludes $1,000,000 allocation to navigation.

COLUMBIA BASIN PROJECT

(15 Generator Unit Installation*)

PAYOUT OF OPERATING EXPENSES AND CONSTRUCTION COSTS ALL
COMMERCIAL POWER WITH 3% INTEREST AND PAYOUT OF OPERATIN
AND CONSTRUCTION COSTS ALLOCATED TO IRRIGATION AND RIVER RE

Year	1 Fiscal Year	2 Total Amount of Power Revenues to be Applied on Account of Columbia Basin Project	3 Miscellaneous Income	4 Total Revenues and Income (2 + 3)	5 Total Operation and Maintenance Expenses on Dam, Power Plant and Appurtenant Works to be Returned from Commercial Power Revenues 4/	6 3% Interest on Construction Costs Allocated to Commercial Power (3% on Preceding Years Amount in Col. 14 plus 1/2 of Additions in Col. 12)	7 Remaining Revenues Available for Return of Construction Costs (Including Replacements) Allocated to Commercial Power — Annual Amount (4-5-6)	7 Remaining Revenues Available for Return of Construction Costs (Including Replacements) Allocated to Commercial Power — Cumulative Total of Col. 7	8
	Total Thru June 30, 1944	11,339,719	16,425	11,356,144	2,793,947	5,939,719	2,622,478	2,622,478	38,838,195
	1945	5,078,961	8,565	5,087,526	1,902,444	2,478,961	706,121	3,328,599	1,034,636
	1946	6,000,000	7,325	6,007,325	1,805,873	2,523,364	1,678,088	5,006,687	1,136,331
5	1947	6,000,000	12,973	6,012,973	1,077,003	2,617,576	2,298,394	7,305,081	3,236,563
	1948	6,200,000	6,873	6,206,873	1,618,641	2,842,334	1,745,895	9,050,976	- 992,368
	1949	9,000,000	11,990	9,011,990	1,318,315	3,176,156	4,517,219	13,568,195	517,760
	1950	10,000,000	8,296	10,008,296	1,690,352	3,518,735 1/	4,799,209	18,367,404	987,187
	Totals to Date	53,618,680	72,447	53,691,127	12,206,578	23,117,245	18,367,404	18,367,404	44,758,304
	Estimate for								
	1951	8,043,200	10,000	8,053,200	1,700,000	3,602,345	2,750,855	21,118,259	3,519,425
10	1952	9,506,470	10,000	9,516,470	1,830,000	3,541,708	4,144,762	25,263,021	1,608,425
	1953				1,910,012	3,450,841	4,155,617	29,418,638	573,300
	1954				2,025,750	3,342,685	4,148,035	33,566,673	477,487
	1955				2,146,000	3,225,406	4,145,964	37,711,737	-0-
	1956				2,164,500	3,101,054	4,250,916	41,962,653	-0-
15	1957					2,973,526	4,378,444	46,341,097	-0-
	1958					2,851,731	4,500,239	50,841,336	464,203
	1959					2,733,800	4,618,170	55,459,506	464,203
	1960					2,610,171	4,741,799	60,201,305	464,203
	1961					2,475,690	4,876,280	65,077,585	-0-
20	1962					2,329,897	5,022,073	70,099,658	
	1963					2,190,589	5,161,381	75,261,039	
	1964					2,052,998	5,298,972	80,560,011	
	1965					1,903,599	5,448,371	86,008,382	
	1966					1,744,183	5,607,787	91,616,169	
25	1967					1,578,379	5,773,591	97,389,760	
	1968					1,443,252	5,908,718	103,298,478	
	1969					1,321,060	6,030,910	109,329,388	
	1970					1,166,334	6,185,586	115,514,974	
	1971					989,655	6,362,315	121,877,289	
30	1972					813,452	6,539,518	128,415,807	
	1973					722,760	6,629,210	135,045,017	
	1974					663,467	6,688,503	141,733,520	
	1975					529,606	6,822,364	148,555,884	
	1976					350,604	7,001,366	155,557,250	
35	1977					179,288	7,172,682	162,729,932	
	1978					-0-	7,351,970	170,081,902	
	1979							177,433,872	
	1980							184,785,842	
	1981							192,137,812	
40	1982							199,489,782	
	1983							206,841,752	
	1984							214,193,722	
	1985							221,545,692	
	1986							228,897,662	
45	1987							236,249,632	
	1988							243,601,602	
	1989							250,951,572	
	1990							258,305,542	
	1991							265,657,512	
50	1992	9,506,470		9,516,470			7,351,970	273,009,482	
	1993	9,318,900		9,328,900			7,164,400	280,173,882	
	1994							287,338,282	
	1995							294,502,682	
	1996							301,667,082	
55	1997							308,831,482	
	1998							315,995,882	
	1999							323,160,282	
	2000							330,324,682	
	2001							337,489,082	
60	2002							344,653,482	
	2003							351,817,882	
	2004							358,982,282	
	2005							366,146,682	
	2006							373,311,082	
65	2007							350,475,482	
	2008							387,639,882	
	2009							394,804,282	
	2010							401,968,682	
	2011							409,133,082	
70	2012							416,297,482	
	2013							423,461,882	
	2014							430,626,282	
	2015							437,790,682	
	2016							444,955,082	
75	2017	9,318,900	10,000	9,328,900	2,164,500		7,164,400	452,119,482	
	Totals	684,399,650	742,447	685,142,097	156,017,340	77,005,275	452,119,482		52,329,550
3/, 3/	2018 - 2044	251,610,300	270,000	251,880,300	58,441,500	-0-	193,438,800	645,558,282	-0-
	Totals	936,009,950	1,012,447	937,022,397	214,458,840	77,005,275	645,558,282		52,329,550

Year	9 Construction Costs and Replacements Allocated to Commercial Power — Construction Costs of Dam, Reservoir and Appurtenant Works Allocated to Commercial Power	10 Construction Costs and Replacements Allocated to Commercial Power — Construction Costs of Power Plant Allocated to Commercial Power	11 Construction Costs and Replacements Allocated to Commercial Power — Replacements On Dam, Power Plant and Appurtenant Works Allocated to Commercial Power 5/	12 Construction Costs and Replacements Allocated to Commercial Power — Total — Annual Total ($\times 10^{-11}$)	12 Construction Costs and Replacements Allocated to Commercial Power — Total — Cumulative Total of Col. 12	13 Remaining Amount to be Returned as of end of each year (13 - 8)	14 Commercial Power Revenues Available for Return of Construction Costs and Expenses Allocated to Irrigation and River Regulation	15 Total Payments by Water Users 5/	16 Payments for River Regulation Benefits by Projects not Marketing Power through Bonneville Power Administration (Rock Island Dam)	17 Total Revenues Available for Return of Construction Costs and Expenses Allocated to Irrigation and River Regulation (15+16+17)
			-0-	84,279,291	84,279,291	81,656,813	-0-	-0-	-0-	-0-
				1,950,357	86,229,648	82,901,049				
				2,422,189	88,651,837	83,645,150				
5				8,548,112	97,199,949	89,894,868				
				9,699,182	106,899,131	97,848,155				
			131,134	16,067,432	122,966,563	109,398,368		515		515
			283,378	15,553,602	138,520,165	120,152,761		4,682		4,682
			131,512	138,520,165	138,520,165	120,152,761		5,197		5,197
	3,519,425	-3,668,599	-0-	-149,174	138,370,991	117,252,732		5,100		5,100
10	1,608,425	-0-	-0-	1,608,425	139,979,416	114,716,395		7,617		7,617
	573,300		50,000	623,300	140,602,716	111,184,078		56,949		56,949
	477,487		-0-	477,487	141,080,203	107,513,533		128,888		128,888
	-0-		-0-	-0-	141,080,203	103,368,466		171,146		171,146
15	-0-		-0-	-0-	141,080,203	99,117,550		638,676		638,676
	-0-		-0-	-0-	141,080,203	94,739,106		665,694		665,694
	464,203		173,000	637,203	141,717,406	90,876,070		831,685		831,685
	464,203		37,000	501,203	142,218,609	86,759,103		1,041,827		1,041,827
	464,203		29,000	493,203	142,711,812	82,510,507		1,044,971		1,044,971
	-0-		25,000	25,000	142,736,812	77,659,227		1,091,250		1,091,250
20			8,000	8,000	142,744,812	72,645,154		1,230,500		1,230,500
			749,000	749,000	143,493,812	68,232,773		1,369,750		1,369,750
			401,000	401,000	143,894,812	63,334,801		1,509,000		1,509,000
			237,000	237,000	144,131,812	58,123,430		1,646,250		1,646,250
			32,000	32,000	144,163,812	52,547,643		1,780,500		1,780,500
25			130,000	130,000	144,293,812	46,904,052		1,904,750		1,904,750
			2,408,700	2,408,700	146,702,512	43,404,034		2,021,000		2,021,000
			1,262,625	1,262,625	147,965,137	38,635,749		2,128,250		2,128,250
			487,475	487,475	148,452,612	32,937,638		2,219,500		2,219,500
			101,750	101,750	148,554,362	26,677,073		2,368,750		2,368,750
30			875,975	875,975	149,430,337	21,014,530		2,483,000		2,483,000
			6,154,984	6,154,984	155,585,321	20,540,304		2,596,250		2,596,250
			3,150,550	3,150,550	158,735,871	17,002,351		2,708,500		2,708,500
			1,302,400	1,302,400	160,038,271	11,482,387	(7-11)	2,819,750		2,819,750
			408,850	408,850	160,447,121	4,889,871		2,878,875		2,878,875
35			2,172,825	2,172,825	162,619,946	-0-	109,986	2,937,000		3,046,986
			2,900,798	2,900,798	165,520,744		4,451,172	3,003,625		7,454,797
			2,466,975	2,466,975	167,987,719		4,884,995	3,007,625		7,892,620
			1,405,075	1,405,075	169,392,794		5,946,895	3,011,625		8,958,520
			1,069,300	1,069,300	170,462,094		6,282,670	3,016,625		9,299,295
40			1,685,350	1,685,350	172,147,444		5,666,620	3,020,625		8,687,245
			1,693,675	1,693,675	173,841,119		5,658,295	3,024,625		8,682,920
			1,655,750	1,655,750	175,496,869		5,696,220	3,028,625		8,724,845
			611,425	611,425	176,108,294		6,740,545	3,032,625		9,773,170
			421,800	421,800	176,530,094		6,930,170	3,037,525		9,967,795
45			512,450	512,450	177,042,544		6,839,520	3,041,625		9,881,145
			1,134,975	1,134,975	178,177,519		6,216,995	3,045,625		9,262,620
			488,400	488,400	178,665,919		6,863,570	3,049,625		9,913,195
			85,100	85,100	178,751,019		7,266,870			10,316,495
			81,400	81,400	178,832,419		7,270,570			10,320,195
50			65,675	65,675	178,898,094		7,286,295			10,335,920
			2,858,250	2,858,250	181,756,344		4,306,150			7,355,775
			1,262,625	1,262,625	183,018,969		5,901,775			8,951,400
			432,900	432,900	183,451,869		6,731,500			9,781,125
			47,175	47,175	183,499,044		7,117,225			10,166,850
55			775,150	775,150	184,274,194		6,389,250			9,438,875
			3,700	3,700	184,277,894		7,160,700	3,049,625		10,210,325
			393,125	393,125	184,671,019		6,771,275	2,730,875		9,502,150
			385,725	385,725	185,056,744		6,778,675	2,624,625		9,403,300
			385,725	385,725	185,442,469		6,778,675	2,518,375		9,297,050
60			385,725	385,725	185,828,194		6,778,675	2,412,125		9,190,800
			7,175,259	7,175,259	193,003,453		-10,859	2,305,875		2,295,016
			3,455,800	3,455,800	196,459,253		3,706,600	2,199,625		5,908,225
			1,131,275	1,131,275	197,590,528		6,033,125	2,093,375		8,126,500
			49,025	49,025	197,639,553		7,115,375	1,987,125		9,102,500
65			1,902,725	1,902,725	199,542,278		5,261,675	1,880,875		7,142,550
			-0-	-0-	199,542,278		7,164,400	1,774,625		6,939,025
			951,825	951,825	200,494,103		6,212,575	1,668,375		7,880,950
			951,825	951,825	201,445,928		6,212,575	1,562,125		7,774,700
			951,825	951,825	202,397,753		6,212,575	1,455,875		7,668,450
70			951,825	951,825	203,349,578		6,212,575	1,349,625		7,562,200
			3,512,222	3,512,222	206,861,800		3,652,178*	1,243,375		4,895,553
			2,139,525	2,139,525	209,001,325		5,024,875	1,137,125		6,162,000
			511,525	511,525	209,512,850		6,652,875	1,030,875		7,683,750
			175,750	175,750	209,688,600		6,988,650	977,750		7,966,400
75			377,288	377,288	210,065,888		6,787,112	924,625		7,711,737
	52,329,550	89,678,750	68,057,588	210,065,888			242,053,594	117,965,000		380,118,594
3/, 3/	-0-	-0-	30,416,877	30,416,877	240,482,765		163,021,923	23,301,000		186,322,923
	52,329,550	89,678,750	98,474,465	240,482,765			405,075,517	161,266,000		566,341,517

*This schedule covers an installation of only fifteen main generator units at Grand Coulee Dam. Three additional main generator units estimated to cost $16,350,000 upon completion will be installed in calendar year 1951. See note 6 for costs incurred to June 30, 1950 for these three units, the installation of which will complete the power plant. 6/

THE ACCOMPANYING

COLUMBIA BASIN PROJECT

(15 Generator Unit Installation*)

PAYOUT OF OPERATING EXPENSES AND CONSTRUCTION COSTS ALLOCATED TO COMMERCIAL POWER WITH 3% INTEREST AND PAYOUT OF OPERATING EXPENSES AND CONSTRUCTION COSTS ALLOCATED TO IRRIGATION AND RIVER REGULATION 3/

	11	12	13	14	15	16	17	18	19	20	
	Construction Costs and Replacements Allocated to Commercial Power				Commercial Power Revenues Available for Return of Construction Costs and Expenses Allocated to Irrigation and River Regulation		Payments for River Regulation Benefits by Projects not Marketing Power through Bonneville Power Administration (Rock Island Dam)	Total Revenues Available for Return of Construction Costs and Expenses Allocated to Irrigation and River Regulation (15+16+17)			
	Replacements On Dam, Power Plant and Appurtenant Works Allocated to Commercial Power	Total Annual Total (10^{-6} 11)	Total Cumulative Total of Col. 12	Remaining Amount to be Returned as of end of each year (13 - 8)		Total Payments by Water Users 5/			Operation and Maintenance Expenses on Power Plant Allocated to Irrigation Pumping	Replacements on Power Plant Allocated to Irrigation Pumping 4/	
	4/ -0-	84,279,291	84,279,291	81,656,813	-0-	-0-	-0-	-0-	-0-	-0-	
		1,950,357	86,229,648	82,901,049							
		2,422,189	88,651,837	83,945,150							
		8,548,112	97,199,949	89,891,868							
		9,699,182	106,899,131	97,848,155							
	131,134	16,067,432	122,966,563	109,398,368		515		515			
	283,378	15,553,602	138,520,165	120,152,761		4,682		4,682			
	611,512	138,520,165	138,520,165	120,152,761		5,197		5,197			
	-0-	-149,174	138,370,991	117,252,732		5,100		5,100			
	-0-	1,608,425	139,979,416	114,716,395		7,617		7,617			
	50,000	623,300	140,602,716	111,184,078		56,949		56,949	169,988		
	-0-	477,487	141,080,203	107,513,530		128,888		128,888	164,250		
	-0-	-0-	141,080,203	103,368,466		171,146		171,146	174,000		
	-0-	-0-	141,080,203	99,117,550		638,676		638,676	175,500		
	-0-	-0-	141,080,203	94,739,106		665,694		665,694			
	173,000	637,203	141,717,406	90,876,070		831,685		831,685			
	37,000	501,203	142,218,609	86,759,103		1,041,827		1,041,827			
	29,000	493,203	142,711,812	82,510,507		1,044,971		1,044,971			
	25,000	25,000	142,736,812	77,659,227		1,091,250		1,091,250			
	8,000	8,000	142,744,812	72,645,154		1,230,500		1,230,500			1,
	749,000	749,000	143,493,812	68,232,773		1,369,750		1,369,750			1,
	401,000	401,000	143,894,812	63,334,801		1,509,000		1,509,000			1,
	237,000	237,000	144,131,812	58,123,430		1,646,250		1,646,250			1,
	32,000	32,000	144,163,812	52,547,643		1,780,500		1,780,500			1,
	130,000	130,000	144,293,812	46,904,052		1,904,750		1,904,750			1,
	2,408,700	2,408,700	146,702,512	43,404,034		2,021,000		2,021,000		195,300	1,
	1,262,625	1,262,625	147,965,137	38,635,749		2,128,250		2,128,250		102,375	1,
	487,475	487,475	148,452,612	32,937,638		2,249,500		2,249,500		39,525	2,
	101,750	101,750	148,554,362	26,677,073		2,368,750		2,368,750		8,250	2,
	875,975	875,975	149,430,337	21,014,530		2,483,000		2,483,000		71,025	2,
	6,154,984	6,154,984	155,585,321	20,540,304		2,595,250		2,596,250		257,016	2,
	3,150,550	3,150,550	158,735,871	17,002,351		2,708,500		2,708,500		255,450	2,
	1,302,400	1,302,400	160,038,271	11,482,387	(7-11)	2,819,750		2,819,750		105,600	2,
	408,850	408,850	160,447,121	4,889,871		2,878,875		2,878,875		33,150	2,
	2,172,825	2,172,825	162,619,946	-0-	109,986	2,937,000		3,046,986		176,175	2,
	2,900,798	2,900,798	165,520,744		4,451,172	3,003,625		7,454,797		225,202	7,
	2,466,975	2,466,975	167,987,719		4,884,995	3,007,625		7,892,620		200,025	7,
	1,405,075	1,405,075	169,392,794		5,946,895	3,011,625		8,958,520		113,925	8,
	1,069,300	1,069,300	170,462,094		6,282,670	3,016,625		9,299,295		86,700	9,
	1,685,350	1,685,350	172,147,444		5,666,620	3,020,625		8,687,245		136,650	8,
	1,693,675	1,693,675	173,841,119		5,658,295	3,024,625		8,682,920		137,325	8,
	1,655,750	1,655,750	175,496,869		5,696,220	3,028,625		8,724,845		134,250	8,
	611,425	611,425	176,108,294		6,740,545	3,032,625		9,773,170		49,575	9,
	421,800	421,800	176,530,094		6,930,170	3,037,625		9,967,795		34,200	9,
	512,450	512,450	177,042,544		6,839,520	3,041,625		9,881,145		41,550	9,
	1,134,975	1,134,975	178,177,519		6,216,995	3,045,625		9,262,620		92,025	8,
	488,400	488,400	178,665,919		6,863,570	3,049,625		9,913,195		39,600	9,
	85,100	85,100	178,751,019		7,266,870			10,316,495		6,900	10,
	81,400	81,400	178,832,419		7,270,570			10,320,195		6,600	10,
	65,675	65,675	178,898,094		7,286,295			10,335,920		5,325	10,
	2,858,250	2,858,250	181,756,344		4,306,150			7,355,775		231,750	6,
	1,262,625	1,262,625	183,018,969		5,901,775			8,951,400		102,375	8,
	432,900	432,900	183,451,869		6,731,500			9,781,125		35,100	9,
	47,175	47,175	183,499,044		7,117,225			10,166,850		3,825	9,
	775,150	775,150	184,274,194		6,389,250			9,438,875		62,850	9,
	3,700	3,700	184,277,894		7,160,700	3,049,625		10,210,325		300	10,
	393,125	393,125	184,671,019		6,771,275	2,730,875		9,502,150		31,875	9,
	385,725	385,725	185,056,744		6,778,675	2,621,625		9,403,300		31,275	9,
	385,725	385,725	185,442,469		6,778,675	2,518,375		9,297,050		31,275	9,
	385,725	385,725	185,828,194		6,778,675	2,412,125		9,190,800		31,275	8,
	7,175,259	7,175,259	193,003,453		-10,859	2,305,875		2,295,016		339,741	1,
	3,455,800	3,455,800	196,459,253		3,708,600	2,199,625		5,908,225		280,200	5,
	1,131,275	1,131,275	197,590,528		6,033,125	2,093,375		8,126,500		91,725	7,
	49,025	49,025	197,639,553		7,115,375	1,987,125		9,102,500		3,975	8,
	1,902,725	1,902,725	199,542,278		5,261,675	1,880,875		7,142,550		154,275	6,
	-0-	-0-	199,542,278		7,164,400	1,774,625		8,939,025		-0-	8,
	951,525	951,525	200,494,103		6,212,575	1,668,375		7,880,950		77,175	7,
	951,825	951,825	201,445,928		6,212,575	1,562,125		7,774,700		77,175	7,
	951,825	951,825	202,397,753		6,212,575	1,455,875		7,668,450		77,475	7,
	951,825	951,825	203,349,578		6,212,575	1,349,625		7,562,200		77,475	7,
	3,512,222	3,512,222	206,861,800		3,652,178	1,243,375		4,895,553		274,778	4,
	2,139,525	2,139,525	209,001,325		5,024,875	1,137,125		6,162,000		173,475	5,
	511,525	511,525	209,512,850		6,652,875	1,030,875		7,683,750		41,475	7,
	175,750	175,750	209,688,600		6,988,650	977,750		7,966,400		14,250	7,
	377,288	377,288	210,065,888		6,787,112	924,625		7,711,737	175,500	61,200	7,
	68,057,588	210,065,888			242,053,594	137,965,000		380,018,594	11,389,238	4,862,412	363,
	30,416,877	30,416,877	240,482,765		163,021,923	23,301,000		186,322,923	4,738,500	2,625,696	178,
	98,474,465	240,482,765			405,075,517	161,266,000		566,341,517	16,127,738	7,488,108	542,

THE ACCOMPANYING NOTES ARE AN INTEGRAL PART OF THIS

Schedule C-2
Fiscal Year 1950
Coulee Dam, Washington
October 4, 1950

21	22	23	24	25	26	27	28	29	30	
Remainder Available for Return of Construction Cost Allocated to Irrigation and River Regulation		Construction Costs Allocated to Irrigation and River Regulation						Remaining Amount to be Returned at end of Each Year (28 - 22)	Fiscal Year	Year
Annual Amount (18-19-20)	Cumulative Total of Col. 21	Dam, Reservoir and Appurtenant Works Allocated to River Regulation	Dam, Reservoir and Appurtenant Works Allocated to Irrigation	Power Plant Allocated to Irrigation Pumping	Irrigation Works	Total Annual Amount (23+24+25+26)	Total Cumulative Total of Col. 27			
									Total Thru June 30, 1944	
-0-	-0-	29,418,740	53,654,020	-0-	7,821,590	90,924,350	90,924,350	90,924,350	1945	
		784,505	1,429,326		548,239	2,762,070	93,686,420	93,686,420	1946	
		801,611	1,569,811		1,535,423	3,906,551	97,652,971	97,652,971	1947	5
		-694,164	2,822,889		11,484,932	13,613,657	111,266,328	111,266,328	1948	
		2,354,030	200,751		19,803,481	22,358,262	133,624,590	133,624,590	1949	
		434,561	791,933		21,709,626	22,936,222	156,560,812	156,560,297	1950	
515	515	748,527	1,363,776		41,599,941	44,012,244	200,573,056	200,567,859	Totals to Date	
4,682	5,197								Estimate for	
5,197	5,197	33,937,015	61,834,579		104,832,932	200,573,055	200,573,056	200,567,859	1950	
-5,100	10,297	2,668,575	4,862,000	5,148,179	40,011,211	52,689,965	253,263,021	253,252,724	1951	
7,617	17,914	1,219,575	2,222,000	500,000	22,153,369	26,094,944	279,357,965	279,340,051	1952	10
-113,039	-95,125	434,700	792,000	700,000	17,345,622	19,272,322	298,630,287	298,725,412	1953	
-35,362	-130,487	342,050	659,636	550,000	9,055,000	10,626,686	309,256,973	309,387,460	1954	
-2,854	-133,341	-0-	-0-	373,071	8,690,000	9,063,071	318,320,044	318,453,385	1955	
463,176	329,835	-0-	-0-	-0-	6,737,000	6,737,000	325,057,044	324,727,209	1956	
490,194	820,029	-0-	-0-		7,640,000	7,640,000	332,697,044	331,877,015	1957	15
656,185	1,476,214	351,979	641,285		7,500,000	8,493,264	341,190,308	339,714,094	1958	
866,327	2,342,541	351,978	641,285		7,300,000	8,293,263	349,483,571	347,141,030	1959	
869,471	3,212,012	351,978	641,285		7,100,000	8,093,263	357,576,834	354,364,822	1960	
915,750	4,127,762	-0-	-0-		5,874,046	5,874,046	363,450,880	359,323,118	1961	
1,055,000	5,182,762				-0-	-0-	363,450,880	358,268,118	1962	20
1,194,250	6,377,012							357,073,868	1963	
1,333,500	7,710,512							355,740,368	1964	
1,470,750	9,181,262							354,269,618	1965	
1,605,000	10,786,262							352,664,618	1966	
1,729,250	12,515,512							350,935,368	1967	25
1,650,200	14,165,712							349,285,168	1968	
1,850,375	16,016,087							347,434,793	1969	
2,034,475	18,050,562							345,400,318	1970	
2,185,000	20,235,562							343,215,318	1971	
2,236,475	22,472,037							340,978,843	1972	30
2,143,734	24,615,771							338,835,109	1973	
2,277,550	26,893,321							336,557,559	1974	
2,536,050	29,451,971							333,998,909	1975	
2,670,225	32,122,196							331,328,684	1976	
2,695,311	34,817,507							328,633,373	1977	35
7,054,095	41,871,602							321,579,278	1978	
7,517,095	49,388,697							314,062,183	1979	
8,669,095	58,057,792							305,393,088	1980	
9,037,095	67,094,887							296,355,993	1981	
8,375,095	75,469,982							287,980,898	1982	40
8,370,095	83,840,077							279,610,803	1983	
8,415,095	92,255,172							271,195,708	1984	
9,548,095	101,803,267							261,647,613	1985	
9,758,095	111,561,362							251,889,518	1986	
9,664,095	121,225,457							242,225,423	1987	45
8,995,095	130,220,552							233,230,328	1988	
9,698,095	139,918,647							223,532,233	1989	
10,134,095	150,052,742							213,398,138	1990	
10,138,095	160,190,837							203,260,043	1991	
10,155,095	170,345,932							193,104,948	1992	50
6,948,525	177,294,457							186,156,423	1993	
8,673,525	185,967,982							177,482,898	1994	
9,570,525	195,538,507							167,912,373	1995	
9,987,525	205,526,032							157,924,848	1996	
9,200,525	214,726,557							148,724,323	1997	55
10,034,525	224,761,082							138,689,798	1998	
9,294,775	234,055,857							129,395,023	1999	
9,190,525	243,252,382							120,198,498	2000	
9,090,275	252,342,657							111,108,223	2001	
8,984,025	261,326,682							102,121,198	2002	60
4,779,775	263,106,457							100,344,423	2003	
5,452,525	268,558,982							94,891,898	2004	
7,859,275	276,418,257							87,032,623	2005	
8,923,025	285,341,282							78,109,598	2006	
6,812,775	292,154,057							71,296,823	2007	65
8,763,525	300,917,582							62,533,298	2008	
7,628,275	308,545,857							54,905,023	2009	
7,522,025	316,067,882							47,382,998	2010	
7,415,775	323,483,657							39,967,223	2011	
7,309,525	330,793,182							32,657,698	2012	70
4,445,275	335,238,457							28,212,423	2013	
5,813,025	341,051,482							22,399,398	2014	
7,466,775	348,518,257							14,932,623	2015	
7,776,650	356,294,907							7,155,973	2016	
7,471,037	363,766,944							(316,064) Surplus	2017	75
363,766,944		19,678,450	72,298,000	7,271,350	244,209,180	363,450,880			Totals	
178,958,727	542,725,671	-0-	-0-	-0-	178,114,820	178,114,820	537,765,700	(4,959,971) Surplus	2018 - 2044	
542,725,671		19,678,450	72,298,000	7,271,350	418,324,000	537,765,700			Totals	

OF THIS STATEMENT

Copied by:
Bonneville Power Administration

Summary and notes to schedule C–2

Revenues from Bonneville Power Administration		$675, 021, 150
Payments from Bonneville Dam for river regulation benefits		9, 378, 500
Miscellaneous income		742, 447
Total		685, 142, 097
Operating expenses (commercial power)		156, 017, 340
		529, 124, 757
Interest on power construction costs		77, 005, 275
		452, 119, 482
Commercial power construction costs:		
Joint purpose plant allocation	$52, 329, 550	
Power plant allocation	89, 678, 750	
Replacements	68, 057, 588	
		210, 065, 888
Power revenues available for return of construction costs allocated to river regulation and irrigation		242, 053, 594
Revenues from water users		137, 965, 000
		380, 018, 594
Operating expenses (pumping power)	$11, 389, 238	
Replacements (pumping power)	4, 862, 412	
		16, 251, 650
		363, 766, 944
River regulation allocation	39, 678, 450	
Joint purpose allocation to irrigation	72, 292, 000	
Power plant allocation to irrigation pumping	7, 271, 250	
Irrigation works	244, 209, 180	
		363, 450, 880
Surplus		316, 064

NOTES

1. In the computation of the 3 percent interest on construction costs allocated to commercial power for the fiscal year 1950, net retirement costs, consisting of plant costs, removal costs, and insurance and salvage recovered, have been included in the construction costs allocated to commercial power. Such retirement costs for the fiscal year 1949 had not previously been included in construction costs. The 3 percent interest for the fiscal year 1949 has therefore also been revised to include net retirement costs to June 30, 1949. The resulting increase of $1,740 in interest for the fiscal year 1949 has been added to the interest of $3,516,995 for the fiscal year 1950.

2. The memorandum of understanding dated January 31, 1946 between Bonneville Power Administration and the Bureau of Reclamation requires amortization of a fixed amount of project construction costs ($505,459,180) by the end of fiscal year 2017. An additional $1,000,000 is considered as a nonreimbursable allocation to navigation under the authority of House Document 172, Seventy-ninth Congress, first session. The balance of the estimated project construction costs, under terms of the existing memorandum of understanding, is to be amortized after fiscal year 2017. By that date, water users' obligations for payment of annual construction charges totaling $85 an acre will have been satisfied, and amortization of investment thereafter will be accomplished from net power revenues from the sale of Grand Coulee Dam power marketed by Bonneville Power Administration and from net power revenues from water users utilizing irrigation pumping power. Approximately 91 percent of the remaining amortization after 2017 will result from the former source and about 9 percent from the latter.

3. As shown at the bottom of the pay-out schedule, it is currently estimated that there will remain after the year 2017, under the memorandum of understanding, approximately $174,314,820 of irrigation construction costs to be amortized. Under the existing terms of the memorandum of understanding, this

amortization would probably be accomplished within about 27 additional years, or by about 2044. This date is within the currently estimated life of the major irrigation works. By the year 2044, also, there will have been deposited in a special account within the United States Treasury, under the terms of the memorandum of understanding, approximately $77,000,000 of payments on behalf of the project in excess of those required by law, the annual amount of these payments being an amount determined by computing 3 percent of the then unamortized power-facility investment.

4. Replacement costs shown in columns 11 and 20 of the pay-out schedule total the same amounts shown in the original pay-out schedule attached to the memorandum of understanding. Under terms of the memorandum, revisions of these total amounts are to be made only on mutual agreement of the Administration and the Bureau. Replacement costs for future years are necessarily highly speculative, being conditioned by costs then existing, by the physical life of the property and by the percentage required to be replaced. It appears likely that actual replacement costs through 2017, at current day prices, might be substantially in excess of those shown on the attached schedule. Under paragraphs 9 (f) (2) and 9 (f) (8) of the memorandum of understanding, if increased replacement estimates should be mutually agreed upon by the Administration and the Bureau, they would be met merely by an increase in the allocation to the Bureau of its share of revenues derived from sale of power from Grand Coulee Dam, without any lengthening of the pay-out period indicated in note 2 above.

5. A similar situation exists with respect to revenues from irrigation pumping power, which are necessarily dependent on the amount of irrigated land served in any given year. A recent Bureau estimate would indicate a slight increase by 2017 (about $3,900,000) in the anticipated irrigation pumping revenues. This revised estimate, if mutually agreed upon, would also be offset, under terms of the memorandum, with a slight decrease in the Bureau's allocated share of Grand Coulee Dam revenues, again without material effect on the total pay-out period.

6. The pay-out schedule and the memorandum reflect only pay-out of the 15-generating-unit project authorized under House Document 172, Seventy-ninth Congress, first session. Three additional generating units were authorized for installation at Grand Coulee Dam by House Document 64, Eighty-first Congress, first session. The allocation of revenues from these units between the Administration and the Bureau and the determination of costs required to be returned will be the subject of a supplemental agreement. The house document indicates that anticipated revenues will be ample to return all expected costs within a relatively short repayment period. Costs incurred in connection with the three additional generating units amounted to $54,058 as of June 30, 1949, and to $7,004,580 as of June 30, 1950. These amounts are excluded from the pay-out schedule.

7. Operating expenses shown in column 5 of the pay-out schedule include all costs arising out of the temporary wartime installation and removal from Grand Coulee Dam of two 75,000-kilovolt generators originally designed for Shasta Dam and later transferred, after the end of the war, to that location.

Senator CORDON. Does that also take care of the payment for the Bonneville transmission establishment?

Mr. RAVER. Yes, and we are much further ahead on our transmission system than we are on the dams, because we entered into contracts with the Army and the Bureau to pay out the dams over a 50-year period and we took the swings on revenue on the transmission system. The swings on revenue have been very favorable to us so that we are away ahead of our 50-year amortization schedule on Bonneville Power Administration transmission facilities.

Senator CORDON. That is all properly set out in your report. I think it properly ought to be in the record because it represents a clear statement of the present financial situation from the standpoint of the Government of its investment in this particular venture.

Senator HAYDEN. Are there any further questions anybody wants to ask the Doctor?

IRRIGATION CONTRACT AND SUBSIDY

Senator ELLENDER. This $85 that you spoke of that was a liability of the farmer, how does he put that up, in cash?

Mr. RAVER. No, he has a contract.

This really should be answered by someone from the Bureau of Reclamation, because I have nothing to do with the way these are handled. I can be corrected perhaps if I am wrong. It is my understanding that the Bureau enters into a contract with the farmer. There is an agreement and the repayment schedule is worked out in that agreement.

Senator ELLENDER. Is that a borrowed sum?

Senator HAYDEN. The farmer is supposed to get on the farm and there is a period of time when he pays no construction amount to get himself going.

Senator ELLENDER. When is that $85 paid?

Senator HAYDEN. That is paid over the 40-year period.

Senator ELLENDER. And there is an interest charge to that?

Senator HAYDEN. There is no interest charged on that payment.

Senator ELLENDER. The Government is carrying everything without interest. I did not know that. I want to look into those matters a little bit more.

Senator HAYDEN. Let me explain one further feature: The farmer must pay on his construction over a 40-year period, so much a year. That is in equal payments. Then he shall also pay here the cost of operation and maintenance in addition to that. That adds up to the total cost of water for the crops that he grows for that year.

Senator ELLENDER. Assuming 1,000,000 acres, that is $85,000,000 that is going to be required there in order to finance that. Now where does that money come from?

Senator CORDON. It will be $85,000,000 if you are talking about $85 an acre.

Senator ELLENDER. That is right. Do we advance that to the Reclamation Service to purchase the land, or how is that handled?

Senator HAYDEN. The land belongs to the Government, or a great part of it does.

Senator ELLENDER. It is sold to these prospectors or landowners at around $85 and they pay for it over a period of 40 years without interest?

Senator HAYDEN. Yes.

RECLAMATION LAW

Senator CORDON. Mr. Chairman, I wonder if I might give my colleague a little basic information:

The reclamation law basically provided that a certain portion of moneys received by the Federal Government as a result of its disposition of public land in the reclamation States should be paid into a special fund known as the reclamation fund. That money originated from the sale of public lands in the States affected. That money was used by the Reclamation Bureau as a capital fund from which to construct reclamation and irrigation facilities in the areas. It was taken from the fund and was repayable over a period of not to exceed 40 years, without interest. That was the basic philosophy in back of reclama-

tion. The money arose in the areas, it was expended in the areas and repaid from the areas. The only difference between that, may I say to my friend, and the money that has been expended for the purpose of improving navigation on the Mississippi River is that with respect to the navigation, that is expended from the General Treasury of the Federal Government and is never repaid, either with interest or otherwise.

Senator ELLENDER. It is the same as yours. There is no difference, there.

Senator CORDON. Exactly. Well, the difference is in dollars. The difference between that and reclamation is that in reclamation the Government gets back its principal without its interest.

UTILIZATION OF POWER FACILITIES

Now in later years, as reclamation operations developed, the lands that were easily reclaimed, where there would be no great expenditure, then where more expensive structures were necessary in order to do the same job and there was as a result of the structure water going to waste, there was installed power facilities which simply used that water going to waste, and because it was an integral part of the reclamation system it was deemed sound to use the net proceeds from that added facility for the purpose of helping repay the over-all cost.

Now that over-all cost exceeded what the Reclamation Bureau had set as the maximum amount that the landowner could repay himself. In other words, there was a bigger investment per acre than a reasonable charge to the landowner would meet. That was met out of the net receipts from power sold that was generated as an adjunct to the whole reclamation project.

The power installation in those cases was a part of the reclamation operation, but to the extent that it was chargeable to power, there is interest charged on it. To the extent that the over-all project is dedicated to reclamation, under the basic philosophy there is no interest.

The power aspects at Coulee, at the Grand Coulee Dam pay 3 percent interest to the Federal Government. That portion of the dam dedicated to reclamation does not. But the amount paid by the landowner, whether he takes title from the Government or whether he gets water on his land supplied by the Government, the amount he pays is that portion of the total cost, which the Secretary allocates to reclamation as against what it allocates to power. It is that portion of that allocation which the Secretary has found the landowner can repay. The balance of the amount allocated to power is then charged to power revenue and the power rate must be so fixed as to retire first the principal of the power allocation and the interest on the deferred part, adding the operating cost, and leaving a net amount equal to whatever charge must be met on the irrigation deficiency or subsidy.

That is just a thumbnail picture of it.

Senator ELLENDER. I understand it, but Senator, do you think it was right to extend these payments over 100 years rather than 50?

Senator CORDON. One can say, "Which is better; over 100 years, or never?" because we never pay it on flood control and we never pay it on navigation.

We justify that by serving something in the national interest. In the case of flood control, we pay back nothing. In the case of navigation, we pay back nothing. So it is not open to as much criticism as one might think when you take a look at it.

Senator ELLENDER. That is what I want to do. I want to get a little more information on it. I have been for it and I want to be for it all the time.

FINANCIAL STATEMENT OF BONNEVILLE SYSTEM

Mr. RAVER. Might I give you three figures that might be of interest to you in connection with our operation: Since we started operating this power business up to June 30 of last year, not including this year's operations, there are three figures which show the relative importance of amortization, operation, and interest. We have paid out of our revenues, $47,693,316 as operating expense. We have paid $52,659,109 in interest, and we have amortized $66,088,647 of investment. Those three figures total practically what we have taken in in revenue. But most of our revenues are not going to operating expenses, they are going to interest and amortization.

Senator ELLENDER. That is for Bonneville?

Mr. RAVER. That is the whole thing.

Senator ELLENDER. Grand Coulee?

Mr. RAVER. Grand Coulee Dam, Bonneville Dam, and the transmission system.

Senator HAYDEN. Very well. We thank you, sir.

ADMINISTRATIVE EXPENSES

PURCHASE OF PASSENGER MOTOR VEHICLES

Senator HAYDEN. I will place in the record the amendment submitted by the Department on page 6, line 6, requesting an increase from 12 to 22 in the limitation on the number of passenger motor vehicles that may be purchased during the fiscal year 1952 by the Bonneville Power Administration and ask Dr. Raver if there is any additional information he wishes to give the committee on this amendment.

(The amendment referred to is as follows:)

ADMINISTRATIVE PROVISIONS

(Estimate, 22; act, 17)

(P. 6, line 6)

Page 6, line 6, strike out the word "twelve" and insert in lieu thereof the word "twenty-two".

HOUSE REPORT

In the House report no statement is made concerning the committee's action on this item.

JUSTIFICATION

This amendment restores the 10 additional passenger motor vehicles requested in the budget estimate. Due to the expansion of the operations and maintenance program these 10 passenger motor vehicles will be required throughout the system for supervision of the survey, design, and construction of facilities and inspection of materials contemplated in the fiscal year 1952 program. Extension of the transmission system into new areas has resulted in greater requirements

for vehicles to transport men to points for operation, maintenance and power business activities. Experience in fiscal year 1951 has indicated an unsatisfactory situation on passenger cars which will be corrected with the addition of these vehicles.

Mr. RAVER. We will have replacement for old vehicles. Our people have looked at this from a cost point of view, from the efficiency of running old, broken-down vehicles, and replacing them as our operations expand. My own recommendation is that that amendment not apply.

LIMITATIONS ON TRANSFER OF FUNDS

Senator CORDON. Mr. Chairman, I would like to ask the Doctor a question with respect to the statement that appeared in our report in regard to flexibility in allocating appropriations.

That appeared in the Senate report as I recall it and was authority insofar as the Senate was concerned, and it was not denied otherwise, for a transfer of funds with certain limitations set out in those reports, to give the Administrator leeway in minor changes that might come up as a result of conditions that could not be foreseen, such as an unexpected, especially large call for power in an area where provisions had not been made, and an opportunity perhaps where exp ted increase had not come about and in another area where perhaps some little minor thing in the way of minor construction was found to be necessary that has not been foreseen, could transfer its funds among the items which had been listed by the Administrator as being his justification for his total and which had been adopted by the Congress in setting its appropriated amount.

In your opinion, should that item again appear in the Senate report? In other words, has it been of any value to you? Do you need it or not?

Mr. RAVER. It is of great value to us.

We cannot make program adjustments except by going back through the Bureau of the Budget, anyway. We do not have the freedom entirely that you indicate, there.

Senator CORDON. The report indicated that from the standpoint of the Congress transfers could be made by going to the Bureau of the Budget and it indicated congressional approval of the procedure within the limits set up.

It seemed to me it was a proper provision and I wanted to have your views on it.

Mr. RAVER. From an administrative point of view it is a very important procedure for us, especially in times such as these when we are having difficulties in getting deliveries of material at one spot and we might be able to do something at another spot that we otherwise might not be able to do.

I probably should not raise this at this point since you are about to close the hearing, but your question raises something that is very important to us today along that line.

In connection with the Valhalla substation which was the amendment before you first, this morning, we put out telegraphic bids for transformers at that substation and received a good price and a very good delivery date from one bidder. We thought we would probably have action on this in time to state whether we would accept the bid or not. As it turns out, the action on our supplemental did not come as soon as we anticipated and today is the last day for me to accept that bid.

Now we can handle it by making a program adjustment. I do not want to do it though if it seems to be prejudging what your action is going to be on this supplemental.

Senator CORDON. I would say, Mr. Chairman, that in view of the fact that we should have reasonably good action on this matter and unless there appears to be some very real objection to this appropriative item which was allowed on the other side already, that we might well give an informal approval.

Senator HAYDEN. The House has not acted on it.

Senator CORDON. Then I am entirely in error. I got this mixed up with the first one.

Mr. RAVER. It is a question of whether or not the program adjustment authority that you spoke about is something that might permit us to commit ourselves for the purchase of these transformers.

Senator HAYDEN. If perchance something happened and this extra $3,000,000 was not allowed, could you use that equipment some place else in your system?

Mr. RAVER. Unfortunately, I don't think we can, because these transformers are being purchased for a specific delivery of power at a specific voltage. It is a combination that you just do not have in your substations generally, so I do not believe it would be honest to say that we could use them.

Senator CORDON. As much as I would like to help out, here, I don't see how we can permit it.

This subcommittee could say, "Well, in our view, if we have a good price and this seems to us a sound step forward in the over-all picture, and we have no objection," but our full committee might take a different view—the Senate might and the House might.

Senator HAYDEN. The only thing I could possibly suggest is to possibly get these folks to give you a little extension of time under the circumstances.

Mr. RAVER. We will do the best we can, sir. Thank you very much.

Senator HAYDEN. Thank you, gentlemen.

GEOLOGICAL SURVEY

SURVEYS, INVESTIGATIONS, AND RESEARCH

HOUSE ACTION

Senator HAYDEN. We will now take up the appropriation for the Geological Survey, appearing on page 23, line 12, of the bill.

The House committee allowed the full amount of the 1952 budget estimate, $22,900,000, which amount was reduced on the House floor to $21,900,000.

The Department is requesting that the full amount of the estimate be allowed, and I will place the justification in the record at this point.

(The justification referred to follows:)

SURVEYS, INVESTIGATIONS, AND RESEARCH

(Estimate, $22,900,000; act, $18,882,000)

(House hearings, pt. 2, pp. 827–857)

(P. 23, line 12)

Page 23, line 12, strike out "$21,900,000" and insert in lieu thereof "$22,900,000", the estimate, or an increase of $1,000,000 in the appropriation.

HOUSE REPORT

"The budget estimate of $22,900,000 is recommended for approval by the committee for the activities of the Geological Survey. This compares with an appropriation of $18,882,000, as reduced under section 1214 of the General Appropriation Act for the current fiscal year.

"*Topographic surveys and mapping.*—The estimate of $8,930,000, representing an increase of $1,650,000 over the current-year base, has been approved for a program financed by direct appropriation, State cooperative offerings, and an allocation from Missouri River Basin development funds.

"*Geological and mineral resource surveys and mapping.*—For this activity $6,130,000 is recommended, representing an increase of $1,720,000 above the current-year base amount. The increase is to provide for acceleration of mineral resource studies, increasing the scope of investigations of mineral fuels, expansion in general service geologic mapping and remodeling space in the Denver Federal Center.

"*Water resource investigations.*—These investigations provide basic water facts required for economical development and best use of the Nation's water resources. An appropriation of $6,015,000, representing an increase of $797,000 above the current year base, is recommended.

"*Soil and moisture conservation.*—The estimate of $41,000, which keeps the activity under this heading at the same level as the current year, is approved by the committee.

"*Classification of lands.*—The committee recommends $354,000, as requested in the budget for investigation and classification of Federal lands with respect to mineral and water resources. This represents an increase of $31,000 over the current-year base.

"*Supervision of mining, oil, and gas leases.*—The budget estimate of $910,000 is recommended for approval. This is $65,000 in excess of the base amount for the current fiscal year. Increased funds for 1952 are to provide an operating staff about 25 percent greater than in 1944 to handle a workload approximately 200 percent greater.

"*General administration.*—The estimate of $520,000, representing a $55,000 increase over the amount available for the current year, is approved."

JUSTIFICATION

The amendment restores the $1,000,000 reduction made on the floor of the House. This amount is distributed to activities as follows:

Activity	Appropriated, 1951	Budget estimate, 1952	House bill, 1952	Restoration requested
(a) Topographic surveys and mapping	$7,500,000	$8,930,000	$8,430,000	$500,000
(b) Geologic and mineral resource surveys and mapping	4,420,000	6,130,000	5,880,000	250,000
(c) Water-resources investigations	5,278,000	6,015,000	5,765,000	250,000
(d) Soil and moisture conservation	41,000	41,000	41,000	
(e) Classification of lands	328,000	354,000	354,000	
(f) Supervision of mining and oil and gas leases	850,000	910,000	910,000	
(g) General administratoin	465,000	520,000	520,000	
Total	18,882,000	22,900,000	21,900,000	1,000,000

A breakdown of the restoration request by objects of expenditure follows:

Personal services	$680,000	Other contractual services	$50,000
Travel	70,000	Supplies and materials	70,000
Transportation of things	10,000	Equipment	95,000
Communication services	5,000		
Printing and reproduction	20,000	Total	1,000,000

(*a*) *Topographic surveys and mapping.*—Upon the declaration of a state of national emergency last fall, the Geological Survey reoriented its mapping program to take care of the requirements for typographic mapping related to the national defense. These requirements exceed considerably the Geological Survey's present production capacity. In order to satisfy these minimum requirements for national security, as presented by both civil and military agencies, a total expenditure of slightly more than $100,000,000 for the 6-year period beginning with fiscal year 1952 will be required. It is planned to reach this maximum rate in 1953 or 1954 and the program for 1952 is an orderly step in this direction. Unless the proposed cut of $500,000 for this activity is restored, further delay is inevitable in providing sufficient map coverage for national defense.

(*b*) *Geologic and mineral resources surveys and mapping.*—The needs for increased supplies of mineral and mineral-fuel raw materials to meet the requirements of increasing industrial production are painfully obvious. It follows that increased effort must be made to discover and evaluate as many new domestic sources of these raw materials as possible. The rates of use already exceed rates of discovery. Consequently, it is urged that this item be restored to $6,015,000, the budget estimate.

(*c*) *Water-resources investigations.*—Restoration of the $250,000 for water-resources investigations is urgent in the face of water requirements for defense mobilization. Water demands have increased as demonstrated by the rise in use and per capita consumption in areas of intense concentrations of population and where there has been industrial expansion vital to the welfare and defense of the Nation. National security depends on production which requires that total supply be adequate to meet aggregate needs to the extent that each defense locality be amply supplied. Prerequisite to this security there must be a knowledge of the quantity of water in streams, lakes, surface and underground reservoirs, and how varying conditions affect that quantity; the chemical and physical properties of water with respect to use; the extent to which our water resources have been put to use; and the changes that result and affect further use of water that is used over and over again. A reduction in the program recommended will result in a decrease in the amount of essential water information collected.

STATEMENTS OF WILLIAM E. WRATHER, DIRECTOR, GEOLOGICAL SURVEY; GERALD FITZGERALD, CHIEF TOPOGRAPHIC ENGINEER, GEOLOGICAL SURVEY; WILMOT H. BRADLEY, CHIEF GEOLOGIST, GEOLOGICAL SURVEY; CARL G. PAULSEN, CHIEF HYDRAULIC ENGINEER, GEOLOGICAL SURVEY; HAROLD J. DUNCAN, CHIEF, CONSERVATION DIVISION, GEOLOGICAL SURVEY; GLENDON J. MOWITT, EXECUTIVE OFFICER, GEOLOGICAL SURVEY; AND JOHN L. RAMSEY, BUDGET OFFICER, GEOLOGICAL SURVEY

GENERAL STATEMENT

Mr. WRATHER. I have a brief statement, Mr. Chairman, which I will read or not, as you wish.

I am grateful for the opportunity to appear before this committee to answer any questions that you may have regarding the proposed budget for the Geological Survey for fiscal year 1952 as recently passed by the House of Representatives. I wish to address myself particularly to the 1-million-dollar cut made by the House below the $22,900,000 figure in the President's budget and recommended by the House Appropriation Committee.

Over the years, Survey programs have lagged far behind national needs. Each time the Nation faces an emergency this lag becomes apparent, and determined efforts are made to fill the need quickly. In this emergency period, I feel that I should stress the effect of the cut on the defense effort.

TOPOGRAPHIC MAP COVERAGE

In the field of topographic mapping, the Survey is again faced with the same dilemma that has confronted it during every previous emergency period. During both World Wars, the Nation became sharply aware of the critical lack of adequate topographic-map coverage, but little could be done on short notice to relieve the situation; Once again there is an increased demand for topographic maps, not only from the Department of Defense but also in connection with other work directly or indirectly related to the defense effort. The Survey's topographic mapping program has been rather specifically planned for the next few years, based on a combination of military requests and civil needs that either directly tie in with the defense program or reflect normal long-range needs. The curtailment of the topographic mapping program in 1952 would delay a part of that work for a year and make more difficult the expansion necessary in the following year if the requirements for mapping are to be met in the time set for this work by the Department of Defense.

WATER SHORTAGES

Critical water shortages have been occurring with increasing frequency and intensity. The demands for water, as expressed by water use and per capita consumption, have risen with startling rapidity in industrial areas and where there are heavy population concentrations. The Nation's security requires not only that the over-all supply be adequate but also that each locality upon which the Nation depends for production have an ample supply. Indispensable elements in providing this security are a knowledge of how much water is in streams, lakes, surface reservoirs, and groundwater reservoirs, and how that quantity changes under varying—natural—conditions; the chemical and physical properties of those waters and the uses to which they may be put; the extent to which the water resources are already being utilized; and for the water used nonconsumptively, the changes resulting from use that might affect subsequent use of the water. Any curtailment of the program as recommended by the House committee will inevitably result in a lack of highly important water information.

Senator CORDON. This is an over-all investigation extending over the years, is it not?

Mr. WRATHER. Yes, sir.

Senator CORDON. I wish you would justify them on the basis of facts and not tie them in to national defense when they do not belong there.

Mr. WRATHER. Funds requested for geologic and mineral resource surveys and mapping were, I believe, the absolute minimum needed to support a vigorous and timely program in support of the defense effort. All of our production, both for civilian and military pur-

poses, is dependent on minerals and fuels, and yet we are critically short on about 50 mineral commodities. In order to ensure an adequate supply now and in the years to come, it is essential that we increase significantly our rate of geologic exploration and investigation of potential mineral-producing areas.

TRANSFER OF FUNDS

Senator CORDON. Do you not get funds from your Defense Minerals Administration?

Mr. WRATHER. Yes, we had some transfer of funds during the second and third quarters of this fiscal year, but none since then. In addition to yielding needed information on mineral supplies, the Survey's geologic investigations contribute substantially to our military and civilian construction activities, permitting more economical and safer construction. In view of our power and civilian-defense requirements, I feel that we must push these activities as rapidly as we possibly can. In recognition of the critical need for these data I cannot but feel that to retard such activities at this time will not only be a detriment to the defense program but will ultimately result in large additional cost rather than in economy.

Senator HAYDEN. Now first as to the map. You say that every time we get into a situation like the present and anything has to be done, somebody wants a map. Unless you carry on your mapping program at a regular rate you cannot do that.

PERCENTAGE OF COUNTRY MAPPED

How long will it be before the United States will be totally mapped?

Mr. WRATHER. I would like to have our chief topographic engineer speak on that.

Mr. FITZGERALD. Nearly 50 years at the present rate.

Senator CORDON. How much of it is mapped now?

Mr. FITZGERALD. About 25 percent of it.

Senator CORDON. You pick out the 25 percent that you felt needed it most?

Mr. FITZGERALD. We are doing only those areas that are the most urgently needed and as presented to us through the Bureau of the Budget and other sources.

Senator CORDON. While it may be only 25 percent in area it represents a good deal more than 25 percent in usage and demand?

Mr. FITZGERALD. That is right. Yes, sir.

Senator CORDON. I note here that you have yourself made a reduction of $500,000 in this item in order to accommodate the million dollar reduction that was made on the House floor.

You could vary that and add more to topographic surveys and mapping and take it out of somewhere else if you desired within the Department, could you not?

Mr. WRATHER. That is right. We have allocated the House reduction according to the size of the program or the requested increases. Half to topography and the other half between geology and water.

Senator HAYDEN. Every other civilized country in the world is adequately mapped.

Mr. WRATHER. Yes; the major nations.

Senator HAYDEN. There were figures here to show the British Government was spending more money keeping the maps of Great Britain up to date than we were spending on our entire mapping program. Of course, where there are military considerations as there are on the Continent of Europe, they try to keep it up to date as much as they can.

There were transferred to you during the war considerable sums of money from the military appropriation to map certain critical areas in the United States. What are the prospects of any transfers of that kind now?

Mr. WRATHER. There have been discussions with the military on that very subject. We have had extended discussions with the military to get their ideas as to how the program should be revamped to meet the present situation. We have no assurance whatever of money so far from the military. In other words, it was agreed with the military sometime ago as you will recall that we would be the claimant for the funds necessary to carry on as much of the military mapping program as possible.

REQUEST FOR MILITARY MAPPING

Now, then, I might say that the military is at the present time asking us to do military mapping over and above the capacity of our entire plant. In other words, if we lay aside all civilian requirements and all civilian needs and industrial needs growing out of the defense effort, we still will be unable to meet military needs.

Senator CORDON. You get no transfer?

Mr. WRATHER. We have had some transfer this year. In other words, we have had what amounts to loans or advances from the Army Map Service to accomplish certain photography so as to get into a program, but I would like to have Colonel Fitzgerald speak to that point.

Senator HAYDEN. The point was that during the war we included in the military appropriations sums of money which could be transferred to you to do the work.

Mr. WRATHER. Yes, sir; and we received some.

Senator HAYDEN. Are there any budget estimates or anything of that kind now where the military will come to you?

Mr. WRATHER. Yes, there are.

AMOUNT ADVANCED FOR AERIAL PHOTOGRAPHY

Mr. FITZGERALD. This year when they asked us to increase our mapping to include certain areas in which they were particularly interested, they advanced an amount of money—$200,000—to accomplish aerial photography before the leaves were on the trees, in order to map the area next year.

The original amount requested was $1 million. We have not received that but we are curtailing our own normal civil program in order to accomplish that photography.

This money is in the fourth military supplement which has not yet been approved.

Mr. WRATHER. They have some money in their supplemental estimate for transfer to us.

COORDINATION WITH COAST AND GEODETIC SURVEY

Senator ELLENDER. Are you familiar with the map making done by the Department of Commerce?

Mr. WRATHER. That is the Coast and Geodetic Survey; yes, sir.

Senator ELLENDER. I understood that inside, too, they were making surveys. They showed us a map.

Mr. FITZGERALD. They do no topographic mapping except in connection with hydrographic charts of coastal areas and certain small areas for airport construction, at the request of the Civil Aeronautics Authority.

All of the work that they do in topographic mapping is turned over to us and is drafted and reproduced by the Geological Survey.

However, the Coast and Geodetic Survey program is closely related to our mapping because we depend on them for the triangulation and other first-order control to carry on our topographic mapping program. The two Bureau mapping programs are related in this way.

Senator ELLENDER. Is there any duplication at all between your work and that done by Commerce?

Mr. FITZGERALD. There is no duplication. It is a very carefully coordinated program. Their control program is planned with us and it is carried out to meet our mapping needs.

For nearly 100 years the Coast and Geodetic Survey have been doing this control. The network of first-order control across the country and into Alaska is done by this Bureau. We supplement this network by breaking down the control into smaller areas for mapping and we compile and publish the maps.

Senator ELLENDER. Do you see any object in putting the two services under one?

Mr. FITZGERALD. Yes, sir; I do. The Coast and Geodetic Survey does a great many other things than triangulation. It is responsible, for instance, for hydrographic charting, which is boat work, and prepares charts of the coastal areas of the United States and its possessions as well as the larger rivers, for surface navigation. They also compile aeronautical charts for civil aviation. That is another one of their jobs.

Senator ELLENDER. That is the same kind of work as you do. It is topography. That is why I am saying it is not relegated to coastal work.

They appeared before us some time ago and said it would take 50 or 60 years to complete a topographical map of the United States, as I remember. I may be in error in that. Is that the same as you are doing?

Mr. FITZGERALD. The reason it will take them so long to complete the aeronautical charts is that they depend on the topographic mapping which we do to compile these charts. Our mapping is on a very large scale, in comparison with the aeronautical charts, so that when an area is finished, it is turned over to them and they prepare this special map or chart for air use.

Senator ELLENDER. Do you charge them anything for that service?

Mr. FITZGERALD. Oh, no, sir.

Senator ELLENDER. All the maps you turn over to them, of course, it is at Government expense but you get nothing from them?

Mr. FITZGERALD. There are dozens of agencies who receive our maps in this way. As a matter of fact long before we publish the map it is available to these agencies for their use.

CHARGE FOR MAPS

Senator ELLENDER. Do you dispose of any of your material to anybody?

Mr. FITZGERALD. Oh, yes.

Senator ELLENDER. Do you charge so much for them?

Mr. FITZGERALD. We charge for the printed map at a fixed rate, 20 cents a quadrangle, but long before this is available in final form to the public the various Government agencies and the public can obtain on request, for a small sum, photographic copies of the large-scale, original, manuscript maps, which are needed for construction purposes, defense planning, and many other uses.

Senator ELLENDER. What do you do with the funds you collect?

Mr. FITZGERALD. The amount of money collected for sale of maps goes back to miscellaneous receipts, in the Treasury.

Senator ELLENDER. And must be reappropriated?

Mr. FITZGERALD. That is right.

Senator ELLENDER. You do not spend it?

Mr. FITZGERALD. We do not spend it, no, sir.

Senator ELLENDER. To what extent does the Army or Navy impose on you in getting material for which they do not pay?

Mr. FITZGERALD. They do not impose on us, sir, because they recognize that it is our responsibility to prepare this material for their use.

Senator ELLENDER. I understand that, but because of this emergency do they require more maps from you than heretofore?

Mr. FITZGERALD. That is right.

Senator ELLENDER. Are you asking for more funds in order to be able to make that available?

Mr. FITZGERALD. We are, sir.

Senator ELLENDER. To what extent?

Mr. FITZGERALD. It is difficult to separate the increase that we are asking specifically for the Army because we have built up a gradual increased program in an attempt to get the country mapped within 20 or 25 years.

Senator ELLENDAR. The reason I asked is that Commerce is asking for quite a bit more money for the maps that they made.

Mr. FITZGERALD. That is right.

Senator ELLENDER. Are you familiar with the maps of the United States that are made by the Commerce Department, and used by the Army and the Navy and the Air Force?

Mr. FITZGERALD. Yes, sir, I am familiar with all the maps.

Senator ELLENDER. How do they differ from the kind you make?

Mr. FITZGERALD. The maps that we make are large-scale, topographic quadrangles. The maps that the Coast Survey makes are aeronautical charts for air use, or navigation charts of our waterways and they use the material that we furnish them to prepare their maps. It is really a combined responsibility.

Senator ELLENDER. For the interior of the country?

Mr. FITZGERALD. That is right.

There is no duplication. As a matter of fact, it really dovetails very well together. One service complements the other.

Senator ELLENDER. I did not quite understand it that way. I thought that they made their own maps of the interior.

Mr. FITZGERALD. No, sir, they do not.

Senator HAYDEN. Senator Cordon.

AERIAL PHOTOGRAPHY IN MAPPING

Senator CORDON. I have just one question. It has to do with the method or mechanics of topographic mapping, today.

What percentage of your work do you do from aerial survey?

Mr. FITZGERALD. Every map that we make is based on aerial photographs. Do you remember, sir, your visit to the Arlington office?

Senator CORDON. I have it in mind.

Mr. FITZGERALD. In some cases we still do part of the contouring in the field, if it is a very small contour interval, but we are gradually using the photographs to do more and more of the mapping.

We do certain field operations to insure that the map is absolutely accurate and meets all the specifications, but the airplane photograph and photogrammetry is being used more each year to make maps on all scales.

Senator CORDON. They are greatly increasing the accuracy?

Mr. FITZGERALD. They are greatly increasing the accuracy, that is true.

Senator CORDON. If there were a necessity for expediting photographic mapping in any given area, even though it might be a very large area, by the use of aerial surveys, you could expedite that very considerably?

Mr. FITZGERALD. That is right, although we are using to the maximum extent now, aerial photographs. We do have equipment, however, and we have techniques and methods developed over a period of years that would permit us to expand rapidly in order to accomplish mapping at almost any scale.

COSTS OF MAPPING

Senator HAYDEN. What is the difference in cost in producing the normal map that you have now, and the way you used to do it before you had aerial photography?

Mr. FITZGERALD. That is an extremely difficult question to answer, Senator.

In 1910, for instance, when we mapped Ohio, our costs were around $15 a square mile for a 15-minute quadrangle. That was the maximum cost by ground methods. There was no aerial photography.

At the present time, mapping at that scale costs us more than $100 a square mile. That is due in part to the increased accuracy and also in part to the increased costs of everything we do. In no small part however it is due to increased accuracy. We have very rigid specifications. We do not want to have to do it over again.

Senator CORDON. You have done a remarkable job in topographic work over a great number of years.

RECORDS AND PLANNING IN THE UTILIZATION OF WATER

Senator HAYDEN. We will now get back to the water resources: Is a record that is spasmodic any good on streams or do you have to have it over a period of years?

Mr. WRATHER. This has to be over a period of years, in order to give all the ups and downs caused by climate and rainfall. In other words, a short record is nowhere nearly as good or reliable for planning as a record over a number of years.

Senator HAYDEN. We have found that out to our sorrow in the West, where we thought we had the water but did not have a long enough series of years of record and a dry cycle comes and you are in bad shape.

The President recently had a water resources commission appointed and it was found that it wasn't a question of water in the West but a scarcity of water throughout the United States by reason of the growth of the municipalities and their demands for water. It impressed me for that reason, that there are streams even in the humid sections of the United States where no records have been kept that there is a water need. Is that correct?

Mr. WRATHER. That is true. The great trouble with our records to date is that they cover too short a time on the whole. As a matter of fact, there are a very limited number of adequate records that go back as far as 50 years.

In order to meet the requirements of present-day planning and utilization of water, we need a continuous record over longer periods of time and we need a more thorough network of stream gauging in order to tell whether or not the supply is adequate especially within the smaller areas.

Senator HAYDEN. Water is getting to be in all parts of the United States one of the scarcest commodities that we have. That is the impression I get from these reports.

I have read the House record here and the assumption is that in making this cut that you can shift it around some way or another and you can get along.

Your argument is that to do an efficient job you ought to have the amount of money allowed by the Bureau of the Budget.

What happened to you when the Congressmen voted this percentage cut last year?

Mr. WRATHER. It required a revamping of our whole program, making adjustments all along the line in order to absorb the cut.

It just merely means that you do less work of the type which you really ought to do.

Senator CORDON. You had to absorb part of the extra voluntary cut that the President imposed on you, too, did you not?

Mr. WRATHER. Yes, sir.

Senator CORDON. That was over and above the congressional directive.

Senator ELLENDER. To what extent did you decrease the number of people you worked as a result of that cut?

Mr. WRATHER. I will ask Mr. Ramsey for that.

Mr. RAMSEY. There was no curtailment of people.

Senator ELLENDER. You had the same force?

Mr. RAMSEY. Yes.

Senator ELLENDER. Where did you reduce expenses?

Mr. RAMSEY. The $500,000 cut was below the appropriated amount for 1951. The appropriated amount, however, was considerably greater than the previous year's total.

Senator ELLENDER. What would you have used that $500,000 for if you had it?

Mr. RAMSEY. We would have used it for topographic surveys and mapping, for geological surveys and water resource investigations.

Senator ELLENDER. Why could you not have done it if you had the same people on there?

Mr. RAMSEY. Well, sir, the 1951 appropriation made by Congress was greater than the 1950 appropriation. We received, then, a $500,000 allocation of this cut made by the President, which still left us with a greater amount of funds than we had the previous year.

Senator HAYDEN. Gentlemen, we thank you.

Mr. O'MAHONEY. I notice that the House has made only three cuts and some of it on mapping. It seemed to the members of the committee to be a very valuable service and perhaps we could find some way of restoring some of that, I don't know. I know that the mapping is essential from every point of view in the development of our minerals in the country.

Topographic mapping ought to be completed more rapidly than seems to be possible.

BUREAU OF MINES

CONSERVATION AND DEVELOPMENT OF MINERAL RESOURCES

HOUSE ACTION

Senator HAYDEN. The next item is under the Bureau of Mines, appearing on page 25, line 1, of the bill. For the appropriation "Conservation and development of mineral resources," the budget estimate is $18,700,000, and the House committee and the House allowed $17,950,000, or a reduction of $750,000 under the estimate.

The Department's proposal is to restore the $750,000, allowing the full amount of the estimate, $18,700,000.

JUSTIFICATION

The justification filed by the Department will be inserted in the record at this point.

(The justification referred to follows:)

CONSERVATION AND DEVELOPMENT OF MINERAL RESOURCES

(Estimate, $18,700,000; act, $17,408,000 plus $250,000 supplemental)

(House hearings, pt. 2, pp. 860–883)

(P. 25, line 1)

Page 25, line 1, strike out "$17,950,000" and insert in lieu thereof "$18,700,000", the estimate, or an increase of $750,000 in the appropriation.

HOUSE REPORT

"For the Bureau of Mines the committee has approved appropriations totaling $24,280,000. This is a reduction of $341,100 below the appropriation available for the current year after the reductions under section 1214, and represents a decrease of $750,000 below the amended budget estimates.

"Of an estimate of $18,700,000, the committee recommends approval of $17,950,000 for conserving and developing mineral resources including fuels and minerals and metals, and controlling mine fires.

"*Fuels.*—The budget estimate for activities under this heading total $11,219,500, and has been approved in not to exceed the amount requested for research and engineering investigations on coal and its utilization; for engineering and other research on the development and production of petroleum and natural gas; for the development of processes for the production of synthetic liquid fuels; and also for research on helium and its uses. The budget program under the heading fuels has been approved as presented, except insofar as adjustments may be necessary for increasing the sum to be available for control of fires in inactive coal mines.

"*Minerals and metals.*—The original 1952 budget estimate for investigations and research in the field of metals and other minerals amounted to $6,680,500, as compared with $5,949,058, base amount for the current fiscal year. A supplemental estimate of $750,000 was considered for work at Laramie, Wyo., on the recovery of alumina from anorthosite rock and clay. Undertaking such a program at this time is not justified, and this supplemental budget request is denied. Subject to the absorption of funds for control of fires in inactive coal deposits, the request for minerals and metals activity is approved as proposed in the budget.

"*Control of fires in inactive coal deposits.*—The budget estimate for this activity is $50,000 for the fiscal year 1952 as compared with the base amount of $306,196 available for the current fiscal year. For controlling or extinguishing fires on publicly owned lands or those in inactive or abandoned deposits on private property, the committee has approved $356,000. This sum is to be absorbed from the total appropriation approved for the conservation and development of mineral resources."

JUSTIFICATION

The amendment restores the $750,000 reduction made by the House in the budget estimate. This amount is for the following activity:

Activity	Appropriated 1951	Budget estimate 1952	House bill 1952	Restoration requested
1. Fuels:				
(a) Coal	$2,018,807	$2,060,000	$2,060,000	
(b) Petroleum and natural gas	1,111,597	1,256,000	1,256,000	
(c) Synthetic liquid fuels	8,115,180	7,809,000	7,809,000	
(d) Helium	94,500	94,500	94,500	
2. Minerals and metals:				
(a) Ferrous metals and alloys	2,143,140	2,308,500	2,308,500	
(b) Nonferrous metals	2,672,258	[1] 3,657,000	2,907,000	$750,000
(c) Nonmetallic minerals	772,843	792,000	792,000	
(d) Mineral research, unclassified	373,479	673,000	673,000	
3. Control of fires in inactive coal deposits	356,196	50,000	[2] 50,000	
Total	17,658,000	18,700,000	17,950,000	750,000

[1] Includes $750,000 in H. Doc. 66.

[2] This $50,000 is subject to an increase of $306,000 making total of $356,000 in accordance with directions contained in the House Appropriations Committee report and that difference is to be obtained from various activities in this appropriation item. It is not possible at the present time to determine what will be the distribution of savings among the various activities to make up the amount in question.

Under the Defense Production Act, the Government is entering into contracts that will bring about an increase in production of alumina by 500,000 tons per annum. This represents approximately 65 percent over the present capacity. Under present plans, the additional amount of bauxite required for the program will come from increased imports from Surinam and development of extensive bauxite deposits in Jamaica. Restoration of the $750,000 will permit experimental work on the recovery of alumina from anorthosite, kaolinite and bauxitic clays and other aluminous materials containing large amounts of silica, in the plant proposed for operation at Laramie, Wyo. It is vitally important that our dependence upon foreign supplies, in this connection, be reduced.

STATEMENTS OF JAMES BOYD, DIRECTOR, BUREAU OF MINES; THOMAS H. MILLER, ASSISTANT DIRECTOR, BUREAU OF MINES; J. J. FORBES, CHIEF, HEALTH AND SAFETY DIVISION; AND ELWOOD THOMSON, CHIEF, BUDGET SECTION

Mr. MILLER. Dr. Boyd is at a hearing of the Subcommittee on Mines and Mining. He will try to come in before our hearings are completed.

In his absence, I shall go forward with our presentation.

This item came forward both in connection with our third supplement for 1951 and the regular program for 1952.

In a 1951 supplement we had $350,000 to let the Bureau proceed with a construction item at the cement plant at Laramie, Wyo. In the regular appropriation for 1952, as a supplement we had $750,000 for the operation of the plant in fiscal year 1952. There will be a corresponding item in fiscal year 1953. For completion of the test our estimate was that the total job would cost approximately $2 million.

We have now before you $350,000 for 1951 and $750,000 for 1952.

Senator HAYDEN. Where is the plant located?

Mr. MILLER. At Laramie, Wyo. It is one of the four plants constructed during World War II for the testing of different processes for the production of alumina.

Senator CORDON. Are you back for more money on that already?

Senator O'MAHONEY. I believe you are referring to the operations known.

Mr. MILLER. This item is for operation, not construction.

Senator O'MAHONEY. This has nothing to do with the construction.

Mr. MILLER. The construction is in the third supplemental and the hearings have been completed on it.

Senator O'MAHONEY. My own feeling on that is that the operations appropriation might well await a little development.

Mr. MILLER. Regarding the disposition of the $350,000 item in the third supplemental, that would then be the determining factor on this subject. This item would be out if that is out.

QUESTION ON PRIVATE DEVELOPMENT OF BERYLLIUM

Senator O'MAHONEY. I think the Committee on Interior and Insular Affairs might want to go into the whole matter anyway because there is a problem as to whether or not the Bureau should operate it or whether it should be operated by a private agency.

I was telling Senator Cordon the other day that I was very much surprised and interested in receiving a letter early this week from a gentleman in Denver who advised me that he and some associates had raised $2.5 million and he wants to come to Washington to see whether or not it would possible to purchase this plant. He has, or says he has, a process for making not only alumina, but recovering beryllium and certain other metals that are known to exist in that area. The problem is wholly one of a practicable process of extracting the mineral and it would be a very invaluable thing if it were possible to develop beryllium and I think it is worthy of further consideration by the legislative committee and by the Bureau of Mines as to what the proper steps should be.

Mr. MILLER. I may say, Senator O'Mahoney, that from our standpoint that would be a perfectly simple solution of the problem. The Bureau's interest is in seeing to it that this test is performed. We would just as soon sit on the sidelines and watch some qualified industrial group do it as to do it ourselves. If such an arrangement could be made, it would be appropriate so far as we are concerned.

Senator HAYDEN. Now what is the rest of the money for?

Mr. MILLER. The $750,000?

Senator HAYDEN. Yes.

Mr. MILLER. That would be for operation after the construction part of the plant is finished. It would be for operating in the fiscal year 1952.

Senator ELLENDER. I notice here that the entire amount is taken from nonferrous metals. Is that the operation you talk about? It is on page 113. It seems to have been taken from that one item. Is that right?

Mr. MILLER. There are subdivisions under that item B which provide for aluminum research.

Senator ELLENDER. That is within that same item?

Mr. MILLER. Yes; that is correct.

Senator ELLENDER. Last year you were given $17,658,000. How much did you receive under the 1951 bill?

Mr. MILLER. I am afraid I do not understand your question.

Senator ELLENDER. Was that subject to a cut?

Mr. MILLER. Yes; we had some cuts there.

Senator ELLENDER. In your 1951 appropriations what does that amount to?

Mr. MILLER. The original amount was $18,008,000 and that was reduced to $17,658,000.

Senator ELLENDER. What work did you curtail because of that cut?

Mr. MILLER. Of course, this cut went across the entire conservation appropriation including all the items of 1, 2, and 3 on this sheet. The large part of the cut came from control of mine fires and synthetic-liquid fuels.

Senator ELLENDER. How many people did you have to discharge?

Mr. MILLER. I think the bulk of the money would have been for contracts for more mine fires and it did not necessarily mean reduction of our working force.

Senator ELLENDER. So you had the same number of people. Why could you not have done the work if you retained the same number of people?

Mr. THOMPSON. The fire-control money is for work done by other than Bureau of Mines personnel.

Senator ELLENDER. Who allocated it to that?

Mr. THOMPSON. The Bureau of the Budget recommended how we should cut it.

Senator ELLENDER. So that the cut that was made in your case, you had the same force, you did not eliminate one person?

Mr. FORBES. On the control of fires we carry a very small staff for supervision and most of the money is paid to contractors; we did not make so many contracts.

Senator ELLENDER. You had the same number of people to administer that smaller amount; did you not?

Senator O'MAHONEY. Mr. Chairman, what the witness is trying to say is that the cut in the appropriation would result only in the cut of contracts for hiring private people but the same administrative staff is needed because the work is highly essential and ought to go on and as directed by the House it is proposed to have it continue by absorbing appropriations from other areas.

Senator ELLENDER. How much of the funds that you asked for in 1951 was for the purpose of contracting to have this work done; do you remember?

AMOUNT FOR FIRE CONTROL

Mr. THOMSON. Funds for the control of fires were reduced $130,000.

Senator ELLENDER. One-third.

Mr. THOMSON. That is right.

Senator ELLENDER. How much was cut from that amount?

Mr. THOMSON. For the control of fires we had $488,926 and we were cut $132,730, which left a balance of $356,196.

Senator ELLENDER. How many people did you have to administer that sum?

Mr. FORBES. Five people.

Senator ELLENDER. It remained that figure?

Mr. FORBES. That is correct.

Senator ELLENDER. As to the other work you had to do in which you had this curtailment of expenses, you kept the same people on?

Mr. FORBES. Those same five people; yes. All of this work is done by contract and our engineers have to make these surveys and supervise the work.

Senator ELLENDER. In other words, I have asked not only before this committee but other committees, about the cuts and found they did not reduce the administrative costs of any agency. It is true with your agency?

Mr. FORBES. Not in that particular instance. There were two engineers working out of the Pittsburgh district and three engineers working in the Rocky Mountain district.

It is quite difficult to cut that force of five, because they have to survey these fires and keep in touch with the contractors to see that they are carrying out the provisions of the contracts.

We have made every effort to keep our administrative cost down to the minimum.

Senator ELLENDER. What was your entire cut?

Mr. MILLER. $132,730 for control of fires.

Senator ELLENDER. What was the over-all?

Mr. MILLER. $350,000 in the total appropriation.

Senator ELLENDER. That leaves $220,000. Where did you trim that?

AMOUNT FOR SYNTHETIC FUELS

Mr. MILLER. The next largest item was on synthetic fuels, $166,220.

Senator ELLENDER. Did you retain the same force to administer the smaller sum?

Mr. MILLER. I would assume so. This item was largely for the excess-power program.

Senator ELLENDER. To what extent was your work curtailed because of that decrease in money?

Mr. MILLER. I doubt if it was, sir. I think that the bulk of that $166,000 represents the power-plant operation at Louisiana, Mo.

Senator ELLENDER. In other words, are we to understand that with the cut you were able to do the same amount of work? You could do the job that you would have done with this additional sum had it been left to you?

Mr. MILLER. I think the comparison would be on the funds left in that account, $8,115,180—how that compares with the previous year as to whether we had to increase or reduce force.

I do not know what the comparative item there would be.

Senator ELLENDER. What I am trying to find out from each department is, to what extent was the work you were supposed to do curtailed because of this cut?

Mr. MILLER. I believe we could show a comparative item for the fiscal year 1950 for that item to tell whether there was an increase or decrease in the staff for the synthetic-fuels program.

Senator O'MAHONEY. Why should you be cutting the synthetic-fuels program at all?

Mr. MILLER. I wanted to see if we were permitted to keep the same staff we had in 1950.

REDUCTION OF SYNTHETIC FUELS PROGRAM

Senator O'MAHONEY. It is the most valuable thing you are doing. The work on hydrogenation of coal, according to Dr. Fieldner and Dr. Schroeder, shows that you can make gasoline from coal, now, at from 4 to 5 cents more per gallon than you can make gasoline from petroleum.

Mr. MILLER. That is correct.

Senator O'MAHONEY. There is a shortage of liquid fuel and we need more.

The work that you have done on the shale deposit has been extraordinarily successful. Why should there be any cut at all on that?

Mr. MILLER. Well, we had, of course, not wished to reduce our synthetic fuels program.

Senator O'MAHONEY. Did the Bureau of the Budget reduce it for you?

Mr. THOMSON. The Bureau of the Budget recommended that the reduction of excess power at Louisiana, Mo., take the bulk of the cut. They recommended at least $120,000 be cut out of the excess power at Louisiana, Mo.

Senator O'MAHONEY. What sort of power?

Mr. THOMSON. Excess.

Senator O'MAHONEY. Do you mean electric power?

Mr. BOYD. We have quite a large power plant at Louisiana, Mo.

We were asked to put that in production and sell the power. We had to get an appropriation to run that power plant and the money that comes from the sale of power goes back to the general fund of the Treasury.

Senator O'MAHONEY. Is there still a shortage of power?

Mr. BOYD. There is still a shortage of power in that area and we are still selling the power.

Senator O'MAHONEY. If this cut is made you won't be able to produce that power?

Mr. BOYD. I think we are producing all we can sell anyway and we will not need that much money to do it.

Senator O'MAHONEY. Then it is an economic thing to make the cut?

Mr. BOYD. That is right.

Senator O'MAHONEY. But you are not going to curtail the synthetic fuels program; are you?

Mr. BOYD. Not seriously; no, sir.

Senator O'MAHONEY. Are you going to curtail it at all?

Mr. BOYD. The research will go on, but possibly not at the level we set up to do it. Our expenditures are decreasing because our plants are now built and we do not need the same funds we needed before.

Senator O'MAHONEY. I observed there was a provision in the bill which was taken out on the floor of the House. It is on page 25, beginning in line 19, reading:

Provided, That the unused balance of the contract authorization of $15 million granted in the Interior Department Appropriation Act of 1946 under the heading of "Synthetic liquid fuels" is hereby rescinded.

The House evidently did not want to rescind that appropriation or that unused portion. What does it amount to?

Mr. BOYD. That appropriation for construction is necessary to rebuild the plants as we get new processes worked out in them.

Senator O'MAHONEY. The first question is, What is the unused portion? What is it in dollars?

Mr. THOMSON. It is $6.6 million.

Senator O'MAHONEY. What did you propose to use it for?

Mr. BOYD. For rebuilding portions of the plants that became obsolete as a result of our research work, in the development of the new processes. We have to tear some down and rebuild again.

Senator O'MAHONEY. Did the Bureau of the Budget recommend that that be rescinded?

Mr. THOMSON. Yes; they did.

Senator O'MAHONEY. Why did the House restore it?

Mr. THOMSON. On a point of order on the floor.

Senator O'MAHONEY. That it was legislation?

Mr. THOMSON. It is legislation; that is right, sir.

Senator O'MAHONEY. Now the authorization for that was enacted upon the recommendation of the Committee on Interior and Insular Affairs, and we did it in the belief that it was necessary to maintain the plant in proper order.

Now are you telling us that you do not need it? If you do not need it, I do not want to appropriate it. If you do need it, recognizing as I do that the synthetic liquid-fuel program is one of the most important activities that the Bureau of Mines is carrying on, I want to continue to have it.

Mr. BOYD. We have no plans to use that money at the present time and we have not asked for any money to liquidate the obligations. We are not incurring any more obligations under that authority.

Senator O'MAHONEY. Then you do not need this money?

Mr. BOYD. No.

Senator O'MAHONEY. And this committee could just as well cut it out.

Mr. THOMSON. I understand there is a law that is rescinding all this money anyway and it automatically goes out at the end of 1951.

Senator O'MAHONEY. What do you mean, there is a law?

Mr. THOMSON. I should not have said "law." My reference is to section 108 of this act.

Mr. MILLER. Under the construction part of the appropriation we do not lack money for construction in the synthetic fuels program. For the last several years, we have been able to use appropriated funds for that; we have not had to fall back on this authorization. As long as we were able to get an appropriation for construction under the Synthetic Fuels Act, we have not been utilizing this authorization and if we assume that condition in the future, we shall have no need for it. If that should be cut out, we should have to fall back on this authorization to do further construction at these plants.

Senator ELLENDER. Now you say that the next cut was that $120,000 that you curtailed from the operation of a power plant at Louisiana, Mo.?

Mr. MILLER. Yes.

Senator ELLENDER. You are generating electricity?

Mr. BOYD. Yes.

Senator ELLENDER. Who lost the benefit of that electricity?

Mr. BOYD. We had to make an estimate of how much it would cost to run that plant in full operation and sell the surplus power. The revenues went back into the Treasury, direct.

Now apparently the cost of producing that power was not so much as the original estimates that we had asked for and we would not lose production of power because of that.

Senator ELLENDER. Did you operate that at all?

Mr. BOYD. Oh, yes; we operated it.

Senator ELLENDER. Are you doing that now?

Mr. BOYD. We are still doing it.

Senator ELLENDER. Were you able to operate with $120,000 less, and give the same service?

Mr. BOYD. That is right.

Senator ELLENDER. And give the same service?

Mr. BOYD. Yes.

Senator ELLENDER. Then you did not lose anything?

Mr. BOYD. No; we did not lose anything.

Senator ELLENDER. Now you accounted for one of $132,000 and one of $120,000. What was your other over-all cut of $350,000?

Mr. MILLER. The one we just discussed was $166,000. The $132,000 item was discussed. That is $298,000.

Senator ELLENDER. So even in spite of the cut made in the 1951 appropriation, you were able to go on and practically do the same work as you had done heretofore?

Mr. MILLER. Not on the control of fires, but on the synthetic fuel program, yes. That was out of the $8 million program.

Senator ELLENDER. On this control of fires, was that money that you yourself paid over to have the work done?

Mr. MILLER. That is correct.

Senator ELLENDER. A contribution of the States?

Mr. MILLER. There was matching money in certain instances there, but the reduction meant the Bureau took on fewer projects of that kind. We have unfinished work to do in that field.

The rest of the money was distributed among a number of items. It will show on page 43 of the tabulation in volume 1 of the House hearings.

Senator ELLENDER. If the Senate should refuse to restore this $750,000, you would still have more than you had in 1951, by about almost $300,000. Am I correct in that?

Mr. MILLER. That is correct.

Senator ELLENDER. What additional functions are you going to perform?

Mr. MILLER. Those items again are spread among a number of items.

Senator ELLENDER. What is that?

Mr. MILLER. Those increases are spread among a number of items.

Senator ELLENDER. To do what, get more people, or to buy more of the things you need with which to operate?

Mr. BOYD. Senator, one of the problems we are facing at the moment, as you know, is the shortage of critical materials used in the defense effort. The controls and everything that go with it result in difficulties. Some of our materials have been very, very short.

Senator ELLENDER. I know the necessity of it. I am not talking about that.

Mr. BOYD. The work we have been doing in the past on a peacetime basis has been the normal operation of the Bureau to conserve, increase and make more economic our mineral resources.

Since we have infinitely greater demands on us in the emergency, to increase our metal supplies, the work in the Bureau of Mines and the Geological Survey is contributing in that tremendously. That helps our work.

Senator ELLENDER. You are really asking for about $1 million more than you got in 1951?

Mr. BOYD. I think that is correct.

Senator ELLENDER. Would you say that the bulk of that amount is to be spent in order to develop new strategic materials; that is, where they are located?

Mr. BOYD. Yes. You will notice the main increases occur in ferrous metals and alloys and in nonferrous metals and in mineral research work which is directly attributable to the increase in mineral production.

Senator O'MAHONEY. And may I say, Senator, that it will be most beneficial in helping carry out the purposes and objects of the Defense Production Act.

STOCKPILING OF STRATEGIC AND CRITICAL MATERIALS

The United States as we all know does not have sufficient stockpiles of certain strategic and critical materials, and the Congress has approved in the Defense Production Act, a program which is being carried out by the Department of the Interior which is intended to promote the development of new sources of such minerals in the United States, and this appropriation will be used for that purpose.

Senator ELLENDER. I understand that, but this is $1 million more or almost $1 million more that you are going to spend over what you had last year for that purpose?

Mr. BOYD. No, it is a decrease of $58,000, I believe.

Senator ELLENDER. Your entire over-all appropriation though will be $1 million more than you had last year?

Mr. THOMSON. No. We had available $17,658 million and the House passed $17,950 million.

Senator ELLENDER. I am talking about your budget.

Mr. BOYD. I beg your pardon. That is right, sir.

Senator ELLENDER. That would be a little over $1 million?

Mr. BOYD. Yes; that is correct.

Senator ELLENDER. And do you expect to spend that entire amount in the development of strategic materials?

Mr. BOYD. Yes, sir. Some of the problems that are facing us in this defense operation will call upon the Bureau of Mines for a lot of this. For example, titanium, which we have brought to the threshold of industrial production is becoming short in the program. They will demand of us a tremendous increase. To get that to any kind of economic level we will have to do a substantially increased job in processing. We have not asked about that here because we did not know about it at the time.

Senator ELLENDER. How many more people will you have to add to your present payroll if the entire amount is given to you?

Mr. BOYD. That would be a little difficult to answer, Senator. We have not even brought that project into study.

Senator ELLENDER. How did you reach the conclusion that you needed that much money?

Mr. BOYD. There is a general order of magnitude. We would have to justify the details of it as soon as we got to work on the project. It would be the construction of a pilot plant, which is quite expensive, and then the manpower to run it. That is an example.

We are being called upon for increasing research on chromium deposits in Montana, for example.

SUPPLIES AND MATERIALS

Senator ELLENDER. Approximately how much of this entire appropriation is used to buy machinery and the like for experimentation?

Mr. THOMSON. Are you talking about the $750,000?

Senator ELLENDER. Can you get it percentagewise?

Mr. BOYD. Supplies and materials would be approximately $3 million out of a total of $19 million. That cost has been reduced slightly, but that is the proportion.

Then there are items for contractual services and equipment. These are approximately $5.5 million out of the total.

Senator ELLENDER. Out of the total?

Mr. BOYD. Yes.

Senator ELLENDER. And the rest goes to administrative expenses?

Mr. BOYD. For personal services, travel, transportation, and so forth.

Senator O'MAHONEY. It is my understanding, Dr. Boyd, that the battle to control these coal fires on public land will continue under instructions of the House committee.

Mr. BOYD. I think that is correct.

Senator O'MAHONEY. You do not intend to abandon that at all?

Mr. BOYD. No, sir.

FIRE CONTROL

Senator HAYDEN. You will attempt to control fires in other places?

Mr. BOYD. Yes. I think there were 127 fires burning, of which we have put out a certain number—I cannot give it to you exactly—but many are burning at a tremendous rate, wasting our natural resources.

Mr. FORBES. We are working on 22 fires, of which 9 are on private, abandoned properties.

Mr. BOYD. Under House action, it means recessing parts of our programs in the mineral conservation fields. We have to spread that across the board and reduce our activities to that extent.

Senator HAYDEN. As a dollars and cents proposition, is it worth the money appropriated out of the Treasury to put out these fires in the mines?

Mr. BOYD. I am sure of that, Senator, very definitely. Mr. Forbes has made estimates of the coal saved. Most of this is coal near the surface and easily obtainable that is saved by this operation. Further, it has been burning in many places where it is undermining the communities and the houses are falling in and the fumes from the smoke are a menace to health.

Senator ELLENDER. How much of that coal belongs to private parties?

Mr. BOYD. In the East it is largely in private hands, but in the West much of it is on public lands. Where it is on private lands, they have to put up a third of the money. On public lands, we do it all.

Mr. FORBES. We estimate that 100,000,000 tons of coal will be saved by the completion of the activities in the 19 fires on which we have worked up to this time—some of them are completed. Up to this time 84 fires have been surveyed, including the 19 on which we have worked. The total saving conservation represented by these 84 fires is from 250,000,000 to 300,000,000 tons of coal.

With an appropriation this year of $356,000, you can see that it is a paying proposition to the Government to continue to do something about these fires that are burning up our reserves.

METHODS OF STOPPING FIRES

Senator HAYDEN. How do you put the fires out?

Mr. FORBES. There are different methods, Senator. The one we are using at the present time is trenching and surface sealing. We have developed the sealing method within the last couple of years, and it is saving a tremendous amount of money. Just to give you an example, the fire at Latrobe, Pa., where we made a rough estimate of trenching, there were 20 or 25 new homes there that the fire was moving in on and we figured it in the neighborhood of $250,000. After we started experimenting a little bit more with the thing, we actually controlled that fire for something in the neighborhood of $10,000, by surface sealing. It means we will have to do some maintenance work in connection with those things.

Senator ELLENDER. Do you smother it out?

Mr. FORBES. That is right. Cracks develop which are filled and eventually seal off the fire so that there is no possibility of combustion underneath.

Senator HAYDEN. You keep the air out and it stops the fire?

Mr. FORBES. That is the secret. You keep the air out and the fire will soon extinguish itself by its own gases.

Senator HAYDEN. You might put that in the record.

(The documents referred to are as follows:)

TABLE 1.—*Fires in inactive coal deposits verified by Bureau of Mines personnel*

PENNSYLVANIA

Name of fire	Location of fire	Estimated cost to control [1]	Remarks
Glassport outcrop	Borough of Glassport, Allegheny County	$60,000	In sparsely populated area but could spread to dense one.
West Wilmerding outcrop	West Wilmerding, North Versailles Township, Allegheny County.	43,000	Fire near residential district of 70 to 80 homes.
Monessen outcrop [1]	Monessen, Westmoreland County	20,000	Many homes and a school in vicinity of fire. Several fires involved.
Abandoned coal mine	Moon Township, Allegheny County	10,000	Fire menacing nearby homes and lives and health iof inhabitants.
Do	Between West Elizabeth and Large in Allegheny County	750,000	Fire burning 50 years or more, reducing property values and menacing lives and health.
Do	Near Turtle Creek, Allegheny County		Occupants of caretaker's home in cemetery hospitalized by fumes from fire.
Glass Run	Churchview Ave., Baldwin Township, Allegheny County	20,000	Active fire near residential district and menacing small coal mine operation.
Outcrop	Near Wilkinsburg, Allegheny County		Active fire eventually will affect valuable residential district.
Outcrop of abandoned coal mine	Kennedy Township, Allegheny County		Over $50,000 spent to control fires and protect county road. Fire menaces lives and nearby residences.
Imperial	Imperial, Allegheny County	20,000	Public school 300 feet away menaced.
West Mifflin	West Mifflin Borough, Allegheny County	80,000	Houses very near to fire.
Carnot	Carnot, Allegheny County	5,000	
McKeesport	McKeesport, Allegheny County	20,000	50 houses endangered.
Pittsburgh	Wylie and Herron Aves., Pittsburgh, Allegheny County	26,000	Densely populated district.
Daiseytown	West Pike Run Township, Washington County	25,000	3 houses endangered.
Grandview	Between Donora and Charleroi, Washington County	20,000	Houses within 300 feet of fire.
Smith Township	Smith Township, Allegheny County	80,000	Houses nearby endangered.
Donora	Donora, Washington County	10,000	
Mount Braddock Mine	Mount Braddock, Fayette County	60,000	464 acres of coal endangered.
Smithfield	Smithfield, Nicholson Township, Fayette County	50,000	
Masontown	Masontown, Nicholson Township, Fayette County	320,000	200 acres of coal and many houses endangered.
Clarissa Mine	Vanderbilt, Fayette County	35,000	
Ferguson and Hill Farm Mines	Dunbar, Fayette County	50,000	
Wheeler Mine	Connellsville, Fayette County	23,000	
Puritan Mine	Near McClellandtown, Fayette County	5,000	
Catfish Run	Near Library, Allegheny County	50,000	Menaces Gould development project.
Experimental Mine [2]	Bruceton, Allegheny County	40,000	Bureau of Mines experimental mine, research laboratories, and explosives testing station menaced.
Lloydsville [2]	Near Latrobe, Westmoreland County	12,000	75 houses, industrial plant and main line Pennsylvania R. R. menaced.
Peterman's Corners	Penn Township, Allegheny County	13,000	Many houses menaced.
Sanda Drive	Sanda Drive, Baldwin Township, Allegheny County		Fire menaces 2 radio transmission towers and several houses.
Abandoned coal mine	Borough of Greentree, Allegheny County	10,000	If unchecked, fire will endanger Greentree tunnel of Pittsburgh & West Virginia R. R.
Hockburg Ave	Penn Township, Allegheny County	10,000	Active fire in abandoned mine workings will endanger large residential district.

Hockburg Ave	Penn Township, Allegheny		
Pricedale	Westmoreland County		Fire will endanger high school and residential area.
Hope Hollow Road	Allegheny County		Fire near residential area.
Penn Township	do		Fire in abandoned-mine menaces several residences.
Green Valley	North Versailles Township, Allegheny County		Fire endangers large housing project.
Boston	Lincoln Township, Allegheny County		Fire endangers school building and several houses.
Old Frame	Fayette County		Fire being controlled by property owners and State.
Burgettstown	Washington County		Extensive fire menaces large residential district.
Mount Carmel [3]	Mount Carmel Township, adjoining the borough of Mount Carmel.	135,000	10 double dwellings and occupants menaced: 5,000,000 tons of anthracite endangered.
Carbondale [3]	West side of city of Carbondale, Lackawanna County	242,000	Fire in abandoned strip pit. Inhabitants nearby complain of fume hazard.
Kulpmont [3]	Kulpmont, Northumberland County	105,000	High-school building and other property endangered.
Shamokin	Shamokin, Northumberland County	12,000	Several cemeteries endangered.
Dragondale Coal Co., Sioux	Near Borough of Atlas about 1 mile west of Mount Carmel, Northumberland County.		About 1½ million tons of anthracite have been destroyed and about $400,000 spent to extinguish fire.
Tower City Mine	About 1 mile north of Reinerton in Schuylkill County		Fire started in "bootleg" mine. 3 million tons of anthracite endangered.
Peach Mountain [3]	Pottsville, Schuylkill County	30,000	2 million tons of anthracite endangered.
OHIO			
Sand Run outcrop	About 5 miles south of New Straitsville, Hocking County	$500,000	Destroying vegetation and reforested land nearby and partly mine coal.
New Straitsville outcrop	About ½ miles southeast of New Straitsville, Hocking County.	550,000	Will endanger reforested land, some dwellings and oil wells in the vicinity.
Bellaire	Belmont County	6,000	Houses endangered.
Carbon Hill	Hocking County		Fire burning in abandoned mine workings endangers town of Nelsonville.
Salem Hollow	do		Extensive outcrop fire.
MARYLAND			
Frostburg	Allegany County	$1,500,000	Large coal acreage involved.

See footnotes at end of table, p. 151.

TABLE 1.—*Fires in inactive coal deposits verified by Bureau of Mines personnel*—Continued

Name of fire	Location of fire	Estimated cost to control [1]	Remarks
WEST VIRGINIA			
Maidsville No. 1	Maidsville, Monongalia County	$75,000	5 houses endangered.
Fairmont [2]	Marion County	20,000	Endangered much valuable city property.
Maidsville No. 2	Maidsville, Monongalia County	100,000	
Fairmont	Fairmont, Marion County	15,000	1 house endangered.
Jordan mine	Marion County	50,000	Coal reserves endangered.
Mona mine	Monongalia County	400,000	Do.
Mona-McCartney mine	do	300,000	Do.
Opekiska mine	do	25,000	
Osage mine	do	5,000	
COLORADO			
Outcrop fire I. H. I. mine [2]	About 7 miles northeast of Rifle in Garfield County	$38,000	Fire endangered 320,000 tons of coal on public domain, destroyed tipple of new I. H. I. mine and caused abandonment of new mine. This project has been completed.
Skull Creek mine	Near Rangely, Colo	15,000	1½ million tons of coal on public domain endangered.
Dugger (McMillen) also known as Rollins.	Approximately 6 miles south of Battlement National Forest near Delta, Colo.	20,000	Fire burning in outcrop on public domain for approximately 250 feet on both sides of a gulch. 1 million tons of coal endangered.
North Park outcrop [2]	Near Coalmont, Jackson County	57,000	5 million tons of coal on public domain endangered.
Wisconsin mine	Moffat County	25,000	2 million tons of coal on public domain endangered.
Wise Hill No. 1	Near Craig, Moffatt County	25,000	2 million tons of coal on public domain endangered.
Newcastle	Hogback area, near Newcastle, Colo	50,000	10 million tons of coal on public domain endangered.
MONTANA			
Otto Frank outcrop	About 7 miles east of Bloomfield in Dawson County	$25,000	3 million tons of coal endangered.
Fuller outcrop	About 13 miles west of Savage and 30 miles north of Glendive in Dawson County.		Fire reported smoldering in 30-foot lignite bed.

UTAH			
Abandoned coal mine	In vicinity and west of Scofield, Utah	----------	Fire burning about 50 years on old Union Pacific Coal Co. lease.
WYOMING			
Fire hole outcrop [4]	Little Thunder Basin, near Hi-Light, Wyo	$100,000	20 million tons of coal on public domain endangered.
Laur [3]	Near Gillette, Wyo	7,500	5 million tons of coal on public domain endangered.
Canfield [3]	Near Teckla, Wyo	212,000	15 million tons of coal on public domain endangered.
Hay Creek [4]	Near Gillette, Campbell County	50,000	5 million tons of coal on public domain endangered.
Padlock [4]	30 miles northwest of Gillette, Wyo	40,000	15 million tons of coal on public domain endangered.
Robinson Range [4]	Gillette, Wyo	15,000	2 million tons of coal on public domain endangered.
Verse	Near Verse, Wyo	100,000	12 million tons of coal on public domain endangered.
Moyer Gulch outcrop [3]	About 13.5 miles north of Gillette in Campbell County, Wyo.	74,000	5 million tons of coal on public domain endangered.
Company	Savery, Wyo	25,000	Do.
Snake River	do	25,000	4 million tons of coal on public domain endangered.
Burning Coal [3]	Bill, Wyo	50,000	20 million tons of coal on public domain endangered.
NEW MEXICO			
San Juan	Near LaVentana, N. Mex	$35,000	3 million tons of coal on public domain endangered.
Pyle [4]	4 miles north of Fruitland, N. Mex	2[illegible],000	5 million tons of coal on public domain endangered.
Farmington [4]	Farmington, N. Mex	15,000	3 million tons of coal on public domain endangered.

[1] Where the estimated cost is not listed the investigation has not been completed.
[3] Fire control project started during fiscal year 1949.
[3] Fire control project started during fiscal year 1950.
[4] Fire control projects started during fiscal year 1951.

Status of control of fires in inactive coal deposits undertaken by the Bureau of Mines

Name of fire	Location	Land	Date started	Date completed	Cost
1. I. H. I.	Rifle, Colo	Public	Apr. 29, 1949	July 18, 1949	$38,029
2. North Park	Coalmont, Colo	do	July 9, 1949	Oct. 25, 1949	57,751
3. Peach Mountain	Pottsville, Pa	Private	June 11, 1949	Oct. 16, 1949	30,529
4. Lloydsville	Latrobe, Pa	do	June 15, 1949	July 12, 1949	9,501
5. Lick Run	Bruceton, Pa	Public and private.	July 6, 1949	Sept. 23, 1949	40,452
6. Monessen	Monessen, Pa	Private	do	July 30, 1949	18,424
7. Moyer Gulch	Gillette, Wyo	Public	Nov. 3, 1949	May 25, 1950	39,461
8. Mount Carmel	Mount Carmel, Pa	Private	Mar. 1, 1950		87,420
9. Kulpmont	Kulpmont, Pa	do	May 8, 1950		105,000
10. Carbondale	Carbondale, Pa	do	June 6, 1950		130,000
11. Shamokin	Shamokin, Pa	do	July 11, 1950	Oct. 27, 1959	12,000
12. San Juan	LaVentana, N. Mex	Public	Jan. 11, 1951	(1)	35,000
13. Laur	Gillette, Wyo	do	July 18, 1950	Sept. 12, 1950	6,581
14. Little Thunder [2]	Hilight, Wyo	do	July 19, 1950		75,000
15. Canfield	Teckla, Wyo	do	June 23, 1950	Aug. 5, 1950	72,000
16. Burning Coal mine	Bill, Wyo	do	July 15, 1950	Dec. 30, 1950	54,690
17. Fairmont	Fairmont, W. Va	Private	June 16, 1950	July 12, 1950	20,268
18. Robinson Range [3]	Gillette, Wyo	Public	(4)		[5] 15,000
19. Padlock [3]	do	do	(4)		[5] 25,000
20. Hay Creek [3]	do	do	(4)		[5] 15,000
21. Pyle [3]	Fruitland, N. Mex	do	(4)		[5] 20,000
22. Farmington [3]	Farmington, N. Y	do	(4)		[5] 15,000

[1] Completed.
[2] Drilling completed. Bids for control opened May 8, 1951.
[3] Surveys being made to determine plan of control. Contracts will be let before 1st of July.
[4] Bids for control have been advertised or an engineering survey is in progress; for control during fiscal year 1951.
[5] Estimated cost.

Mr. FORBES. Of course, Senator, you asked about the five people. You see, it is difficult to reduce that number. We only have two of those in the Pittsburgh district taking care of several big fires and we have to keep a finger on everything.

Senator ELLENDER. What I had in mind was that if any curtailment was done that is at least necessary. If you cut down this work and keep people on your staff where they are not important, I just cannot understand it.

Mr. FORBES. In 1949 our fires appropriation was $250,000. We were not able to do very much with the 84 existing fires. In 1950 we got $500,000; in 1951, we got $358,000; in 1952, of course, the House has approved $356,000 or thereabouts.

Now we could use $2 million a year to get this job done quickly.

Senator ELLENDER. That is provided other fires do not break out.

Mr. FORBES. Yes.

REVIEW OF MINERALS SITUATION IN NEW ENGLAND STATES

Senator YOUNG. I am wondering about this new item of $100,000, listed as, "New York-New England Mineral Surveys." Why that particular item, now?

Mr. MILLER. This is a part of the coordinated resource study for the New York-New England area. It is the Bureau of Mines part of the accelerated program in that area. We have a substantial program now that is a part of our normal work there but in order to meet the timetable developed for the coordinated program we must accelerate the work for the next 2 or 3 years.

Senator YOUNG. What is this work?

Mr. MILLER. It is an investigation of mineral deposits in the New York-New England area, the New England States, in terms of their

availability for production. It is a review of the mineral position in the New England States.

Senator YOUNG. Is it strictly a war program?

Mr. MILLER. Our concern is with strategic minerals, but that is only a part of a comprehensive survey.

Senator YOUNG. Do you have money in the supplemental military appropriations?

Mr. MILLER. Not in the ones that are being considered now. We have funds in our regular appropriation for this purpose, such as the investigation of the manganese deposits, but this is an acceleration of such programs. We undertake more field investigations and mineral deposit production potential work in the New England States.

Senator YOUNG. Could you not use the same funds you have used for other areas over the past years? Do you not have a similar program going now in other areas of the United States?

Mr. MILLER. Yes. There is a substantial increase also authorized in this case for the so-called Arkansas, White, and Red River Basin studies that are the same as this item.

We have programs of this nature in a number of parts of the country, yes.

Senator YOUNG. Are they set out in separate items like this?

Mr. MILLER. Only these two programs are pin-pointed in the sense that you mention.

Senator HAYDEN. I notice at page 38 of the bill—

> The balances of all contract authorizations heretofore granted to the Interior Department or any of its bureaus or offices, which remain unused on June 30, 1951, are hereby rescinded.

It was reported out of the committee for 1952 and on the floor of the House it was cut down one year. How does that affect the Bureau of Mines?

Mr. BOYD. The only contract authorization we had was for synthetic fuels, Senator, and that question was discussed before. At the present time, that program would not be affected.

Mr. MILLER. We have other authorizations for things like the Leadville Tunnel.

Senator HAYDEN. How about the Leadville Tunnel?

Mr. MILLER. That was all appropriated last year.

Senator HAYDEN. You are sure that the Bureau of Mines will not be affected in any respect by this blanket removal of contract authorization at the end of this 2 years?

Mr. MILLER. That is on the assumption that the construction items which we are permitted now under the regular bill would be continued. Otherwise as I explained to Senator O'Mahoney we would need the synthetic fuels contract authorization.

ADMINISTRATIVE EXPENSES

PURCHASE OF PASSENGER MOTOR VEHICLES

JUSTIFICATION

Senator HAYDEN. The next amendment appears on page 26, line 7, relating to the purchase of passenger motor vehicles by the Bureau of Mines.

The amendment and the statement thereon by the Department will go in the record at this point.

(The information referred to is as follows:)

ADMINISTRATIVE PROVISIONS

(Estimate, 1951; act, 1950)

(House hearings, pt. 2, pp. 1775 and 1776)

(P. 26, line 7)

Page 26, line 7, after the word "exceed" strike out the following: "one hundred and thirty passenger motor vehicles for replacement only;" and insert in lieu thereof the following: "one hundred and fifty-one passenger motor vehicles, of which one hundred and thirty shall be for replacement only;".

HOUSE REPORT

The House report made no statement concerning the committee's action on this authorization.

JUSTIFICATION

It is recommended that the authorization for the purchase of 21 new automobiles be restored.

Of the 21 new automobiles recommended, 2 will be required in the full operation of the Lignite Research Laboratory; 1 for the Anthracite Research Laboratory; 1 for the program pertaining to coal-mining methods and reduction of losses; 5 for the program pertaining to continued research and pilot plant investigations on complex manganese ores; 8 for the prosecution of the mineral survey of the Arkansas-White and Red River Basins; and 4 for the mineral survey of the New England-New York area. The House bill provided additional funds for all of the above-mentioned programs. These automobiles are needed to complement the greatly expanded conservation and development of mineral resources program of the Bureau of Mines.

Senator HAYDEN. Do you need some new cars?

Mr. MILLER. Particularly for the expanded New York-New England program and the Arkansas, Red, and White River Basin work. More than half of those cars are involved in that program. We also need 5 new cars on the expanded manganese program in several parts of the country.

Of the cars requested, 17 of them are for those two activities alone. The other 4 are scattered in other places.

EFFECT OF JENSEN AMENDMENT

Senator HAYDEN. Let me inquire as to the effect of the so-called Jensen amendment.

Mr. MILLER. Mr. Chairman, the Jensen amendment would have the usual kind of slowing-down effects on the total program of the Bureau, but it would be particularly dangerous in our helium program.

As you know, the Bureau of Mines is the only producer of helium and it is a straight production and sale proposition.

Now to start losing staff on that vital operation would be disastrous. We would actually have to shut down plants.

I have material here which I would like to submit in a more detailed justification if I may put it in the record at this point.

Senator HAYDEN. That may be included.

(The information referred to is as follows:)

EFFECTS OF JENSEN AMENDMENT ON PRODUCTION OF HELIUM

The Bureau of Mines is the only producer of helium. The helium is delivered to the Army, Navy, Atomic Energy Commission, other Federal agencies, and non-Federal consumers for use as a lifting gas in airships and balloons of various types; as an inert gaseous shield in welding magnesium, aluminum, stainless steel, and other metals, especially for construction of aircraft; in various metallurgical operations; in atomic physics; in helium oxygen breathing atmospheres for medical treatment and for diving and caisson operations; for diluting flammable anesthetics to prevent fires and explosions in operating rooms; for detecting leaks and tracing movement of gases in various activities; in range finders; in many types of instruments used in industrial and military operations; and in various types of research. Most of the helium supplied to private industry is used in work on war contracts or in direct relation to military preparedness.

Helium plants must run 24 hours a day, 7 days a week, not only because the helium is extracted from natural gas that flows continuously to fuel-gas markets but also because the temperature of about 300° F. below zero required for the extraction can be maintained only by continuous operation. A man must be on duty at each of the operating posts in the plant on each of the three 8-hour shifts that make up the 24-hour day. The process requires pressures of about 3,000 pounds per square inch and millions of cubic feet of flammable natural gas are processed in a day. Operation with a crew that is inadequate in numbers or in training endangers life and subjects highly valuable properties to hazards of explosions and fires.

The Bureau of Mines is now operating helium plants with the smallest crews that will permit safe and efficient operation. Any material reduction in helium plant personnel will reduce output, decrease efficiency, risk life and limb, and endanger plants and reserves of helium-bearing natural gas in which the Government has a large investment.

There is no training ground for helium-plant employees, except in the Government's plants. Therefore, it is necessary for the Bureau to recruit promising workers, train them in lower-grade positions, and advance them to posts of higher responsibility by filling vacancies as they occur. Trained employees cannot be retained in the service unless they have opportunities to go forward into higher positions. When they advance, it is necessary to fill the positions they vacate to provide the necessary number of employees.

Following World War II, the demand for helium declined from the peak of about 137,000,000 cubic feet per year reached during the war to about 60,000,000 cubic feet a year, and three of the plants were placed in a stand-by status. The post-war demand was filled by operating one plant until August 1950, when increased demands made it necessary to operate a second plant. The Bureau now has two helium plants in operation and two in stand-by status. The demands of the military services, the Atomic Energy Commission, and other users have been increasing rapidly, and are now of the order of 100,000,000 cubic feet a year. It seems likely that operation of a third plant will be required in the fiscal year 1952. The Jensen amendment would make it impossible for the Bureau of Mines to put one or both of the stand-by plants in operation when their output is needed to meet the demands.

Senator HAYDEN. We will adjourn until 10 o'clock Monday morning.

(Whereupon, at 4:10 p. m., Friday, May 11, 1951, the committee recessed to reconvene at 10 a. m., Monday, May 14, 1951.)